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Collection and Field Note Book

No. 52

(April 24, 1958 - Oct. 19, 1958)

(39420 --- 39650)

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1958 Marshall Is.

1

April 24 - Kwajalein I.

Rained last night,
heavy wind & clouds, rough
sea at 8 a.m.

Trinectesphobus very common
on *Tournefortia* trees on
windward side, some seen
on coconut.

Small water strider (*Halovelia*)
collected ~~under~~ under coral boulder
near top of beach.

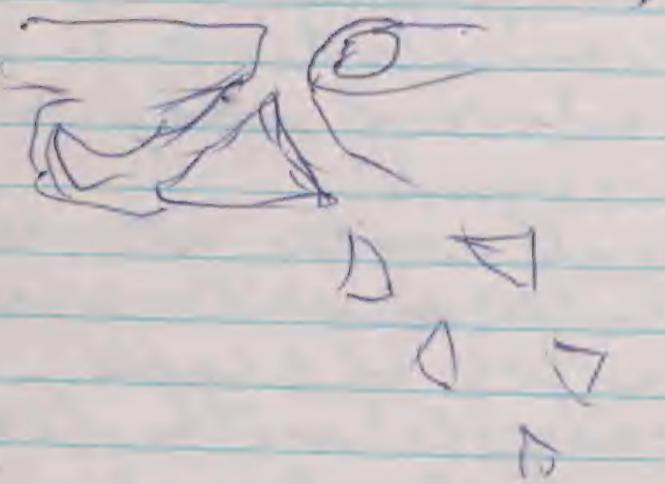
Scaevola with leaves
much thickened and badly
distorted by salt.

Water striders of 2 sorts, one tiny
black one, one large blue one,
around high tide mark under
stones and more commonly in
accumulated tufts of *Jania*, etc.

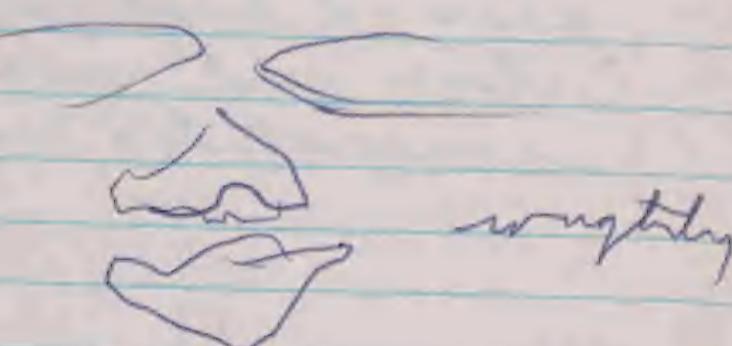
2

1958 Marshall Is.

Apr. 24 Nauru Atoll from
air. (photos 8-10 on Roll 1 b&w)
Narrow pass on west
side, with an arrangement
such as this.



Another, more to south,
with two ~~two~~ reefs
in entrance



Good native vegetation
on 3 islets, esp. the
two on the east reef. Wind
growing very conspicuous
on seaward side, some coconuts.

Many small bars on
reef. all held by beach-rock
or fragments of reef rocks.

99420

Apr. 24 - Kwajalein Islet. Kwajalein Atoll
Trentepohalia
common on bark of Turnerae.

3

Apr. 24 - Ailinglaplap Atoll ^{from air}
No signs of typhoon damage.
Two passes on west side
with long spits or reefs
running inward from
them on both sides.

On north west islet,
especially, there are
patches of forest, surrounded
by coconuts. Much of the
forest a pale yellow-green.
(Photos of Ailinglaplap
from one with curious
remnants of platform on
lagoon side.)

Dull orange color.
and coconut.

Apr. 24 Faluit from air
went ~~up~~ along east side
at 300' alt.

Islets vary much in
extent of damage. All
have some coconut trees
standing, some have many
more trees standing at north end.

Many coconut trees down
on all islets, all of these
almost all, on s.e. side
fell toward lagoon. All
along seaward side of
these islets a great amount
of fresh light colored coral
debris is deposited.

Much root mat of coconuts
left toward lagoon side.

On southeast side
islet, as ~~are~~ narrow,
very little left on them.

Apr. 24 - Jaba Islet -
some trees standing,
many knocked over
or broken off.

On the large part of the
islet among the building
the situation is very
confused, with scouring
and deposition in a
disorderly mess.

Several *Calophyllum*
trees still standing,
at least one *Terminalia*
standing but one very
large one uprooted.

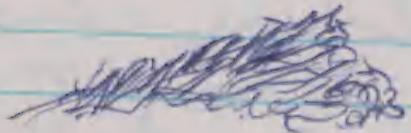
Casuarinas mostly
standing. Some *Pandanus*
standing, many knocked
down, uprooted, or broken
off. All standing trees
except *Pandanus* are
killed back from the tips
to varied distances, many
a most branches broken
off.

Pod of *Fimbristylis cymosa*
apparently unharmed
in places, also *Cyperus* sp.
Phyllanthus amarus
possibly post-typhoon.

Considerable growth of
Crotalaria, fruiting.

On narrow part of island toward Sydney Pier, most of the loose material has been removed ~~but~~ apparently deposited on the outer reef flat. ~~but~~ The surface of the consolidated platform is irregular but not too much so. The outer edge of this is very discolored by algae and cut into an erosion ramp. The white part was more or less level but if anything slopes a little toward the lagoon. On the lagoon side is discolored unconsolidated material with pinkish or purplish silt in interstices.

The reef flat is narrow here, perhaps not more than 100 m. wide. On it has been deposited, by the typhoon, a long boulder or shingle ridge, mostly of large slabs of coral, imbricated upward from the ocean side.



up to 2.5 m. above the reef flat, said to have been generally of this height and nearer the reef margin after the typhoon,

{no!}

but to have been getting lower and nearer the ~~reef~~ shore. ~~There~~ There seems little doubt that this was ~~built~~ entirely constructed by the storm of the material removed from the islet, as there is no loose freshly deposited material elsewhere, yet the consolidated platform has undoubtedly been cleared of loose material. This loose material has had most of the smaller sizes removed and most of what remains is of a single kind of coral (sample). That this is not freshly torn from the reef is shown by the fact that the pieces are somewhat wave worn.

~~+ Here, on the lagoon side are the remains of a Pemphis forest. Many of the trees are knocked down, always falling away from the lagoon. Many are also standing or partly tipped. All are dead distally at least. Many are sending out small leafy twigs from the trunks. These leaves~~

taste more saline than is usual for this species, as well as being astringent. *Pandanus*, on this narrow section, is in very bad condition, mostly dead, whether tipped over, broken off above the roots, or standing.

Tournefortia is rare here, but very heavily sending out new branches from the trunks. *Cordia* is somewhat beaten down but is very abundantly flowering and fruiting; is very local.

Ipomoea pes-caprae and *Wedelia biflora* form mats locally, do not seem to have been inconvenienced by the storm. *Scalovula* is mostly dead but some sticks are sending ~~out~~ out new leafy branches. Occasional patches of *Lepturus* seen, but rare.

April 24 - Jaluit I. between Sydney town and Jabor.

Cordia subcordata Lam.
very local around old construction sites.

Birds seen include several common noddies, one whimbrel, one turnstone, a number of wandering tattlers, possibly one golden plover, and, according to Gerald Wiens, 6-8 reef herons. I saw one white one from the air, the rest are probably correctly identified. They were on the large oil tank at Sydney town. A large flock of birds, very probably shearwaters, fished offshore most of the afternoon. They flew very strongly and gracefully.

Bits of iron, spikes, etc. are scattered on the old platform surface, seem to be cemented in - need further investigation, as McKee & Gressit think they are included in the rock.

Tops of trees killed by typhoon, lower branches very healthy; flowers vermillion.

Apr. 25 Jabo to Mejatts ^{2 noddy} flying
small island inside
pass - many low trees still
standing but badly beaten.
a few - ~~all~~ coconut trees still
standing. A number of
Pandanus still standing, some
with tufts of leaves.

Next islet - about 17 coconut
trees, many Pandanus and
other things but mostly defoliated

Next islet - small one - 4 coconuts

After this we are too far out
for observation till we reach
Imruj Islet, which ~~seems~~ seems
much less affected by the
storm than others. Many
hundreds of coconut trees standing
as well as a green understory
of bushes, young coconuts, pandanus
etc but too far away for good
observation.

Tiny islet between this and
Imruj has 6 coconut, one other
tree standing, some low brush.
Dead material piled up around
islet is white.

Imruj Islet, south end has
many coconut trees standing,

less toward center, at
center almost none, then
more toward north end.

Many bare stubs of
trees without branches.
Some Pandanus with a few
tufts of leaves.

One noddy, one fairy tern.

Islet at inner end of passag
n. of Imruj has 14 coconut
trees standing, considerable
low vegetation, and some
Pisonia.

Mejatts Islet - south end
has quite a lot of coconuts
standing

North of this they are very
sparse. Many more
broken off part way up
than with tops. Much
rubbish on ground. Very
few trees in center part
show any signs of life.
In center some actual gaps
in vegetation, as much as
50 m wide.

~~all~~ 3 noddies flying in lagoon
They are rather common on land.
One gray + white phase vs brown.

A piece of human size of man's fist embedded in old coconut root mass, surrounded by capons of roots. (photos) (wobl)

In a rather sandy place
place old mats of *Lepturus*
and *Thespesia* and a few plants
of *Zizaniopsis* still in good
shape

On south end in wide part
of island coconut and
breadfruit trees mostly
knocked down (photos)
but ground vegetation,
mostly *Lepturus* and
Urua mats, in very
good shape.
Also some *Polypodium*,
many *Pandanus* seedlings
of all ages.

(photo) near south end has an enormous amount of vegetable debris, brush, dead trees, etc accumulated in it. The south half is denuded of large trees, or the few left are dead. Found 1 seedling up to 1 m. as above here, but not very healthy.

The north half is in good shape except that a few old taller trees are dead or broken off. Seedlings of all sizes are abundant in the abundant brush.

On south edge are a few tall *Pemphis* trees, with smaller branches gone, numerous tiny new branches coming out all over trunk and main branches. (photo)

This whole depression is a section of reef flat enclosed by a high, cobbley boulder ridge about 3 m high. The bottom is hard, has holes out of which water pours and into which it is sucked, with a period of about 11 seconds causing a fluctuation of water level.

the beach ridge has
fairly large boards.
Kemphie - Gretta and bally
beaten by wind but still
leafy and green. ^{open} ^{sunne} ^{part}
also some *Fimbristylis*.

Area between swamp and esozon south of ridge has apparently not been swept over by waves. *Fluminis*, *crin*.

Plants on megatide

Coccol mucifera

Many nuts germinating
Young plants 1-2 m. tall knocked
down

Terminalia catappa

Many stumps with sprout

Pandanus tectorius

Many large trees broken off,
uprooted, or with most of branches
broken off. Young ones and seedling
in relatively undisturbed ground
near south end

Tacca leontopetaloides

A few seen with small green leaves
on scorched ground

Many healthy, flowering, on
grassy high places and on black
soil covered by thin sand

Morinda citrifolia - on scorched
seedlings, root sprouts, rare.
On north end around mangrove
swamp and on lagoon side stubs
with clumps of sprouts common.
low saplings or shrubs.

Barringtonia asiatica

Small grove toward south
end - trees of all sizes, mostly
knocked down, but some
standing with branches
removed, all sending out
sprouts, stumps, stubs,
fallen trees, roots, and
some seedlings.

Thunbergia involucrata

one small loose new mat
about 3-4 dm. diam
one old mat but most of
growth new, 3 dm. across, loose
On south end and along
lagoon side large healthy
mats on unscorched ground.

Lepturus

many well developed seedling
on south end and along
lagoon side extending
what's on undisturbed
and sand-covered black soil.

Mosiera longepetala argentea
very small seedling scattered
on south end seedling
abundant. Some old
plants along lagoon
beach ridge, sprouting
from defoliated shrubs.

Canavalia micropoda
 several seedlings about 1-2 cm. tall
 Gerritt saw large plant at mouth end
Intsia bijuga
 several sprouts from broken
 down sapling near south end.
Polypodium scolopendria
 several plants in old
 coconut bases. Clump on
 trunk of fallen breadfruit tree.
 Abundant in undisturbed
 ground on south end and
 along lagoon side.

Wedelia biflora
 seedlings up to 2 cm. long
 common. Some sprouts
 from old stems partly
 buried.
 On south end and along
 lagoon large mats, flowering.

Premna obtusifolia
 clump of sprouts from old palm
 stump.
 rare along lagoon beach ridge
 near south end, sprouting.

Terminalia sericea
 dense clump of sprouts 3-4
 cm. high from old petai palm
 stump.

Grewia species
 a few sprouts from old
 stubs & down saplings
 on old trunks & in thick
 with abundant sprouts.
 common on south end and
 along lagoon side esp. beach ridge.
Ischaemum sericeum
 tiny seedlings, cylindrous
 only, occasional on bare
 pebbly material on outer
 beach ridge. Larger
 seedlings in coconut root
 mats.
 large plants on lagoon
 beach ridge of south end.

Asplenium nidus
 One tiny plant in exposed
 place near base of coconut
 stump. Large clump on side
 of fallen large breadfruit tree.
 Common on ground and on
 trees around mangrove swamp
 on south end, also a ^{small} undisturbed
Artocarpus altilis ^{or some other} ground.

Dead standing trees and
 dead fallen trees seen.
 One fallen sapling with
 a single green sprout,
 not far from lagoon.
 Gerritt noted no seedling (??)
 A large tree sprouting from bare
 tree trunk.

Flaveria undulata
fairly common in undisturbed
grassy areas on north and (Granit)

Phytolacca angustata
also in grassy areas north and
(Granit)

Elettaria indica
also in grassy area on north and
(Granit)

Vigna mungo
Tangled mats, flowering
in unwashed and more rarely
on sand-covered soil near
south end

Pithecellobium aculeata
In mangrove swamp
and in depression near south
end, also some along lagoon
shore. Sprouting abundantly
along trunk and main branches

Pisonia grandis - one small
shrub knocked down but
growing vigorously near
mangrove swamp

Trumpetia procumbens
Seedlings abundant on
uncultivated soil and on sand.

some old plants on undisturbed or sand covered areas.

Nephrolepis acutifolia
Common epiphytic in
mangrove area, but mostly
almost dead or just
beginning to sprout

Bruguiera conjugata
Abundant in large
mangrove swamp, in
part healthy, in part
larger plants dead or
sprouting from base. In
smaller swamps only
seedlings (or a few older)
Does not stand burying
by gravel

Calophyllum inophyllum
Large trees along lagoon
side and some inland
many stood up very
well, others tipped over.
Mostly defoliated but
sprouting.

Pseuderanthemum carinthiacum
var. *atropurpureum*
Large plants in center of
island, bent over but
abundantly flowering
see p 23

and beer bottles around
old house site. Soil is here
North of this is a red
soil, that may have been
covered but not buried by
beach debris, has mats of *Vigna*,
Lepturus, *Wedelia*, *Thunbergia*
in flourishing condition
North of this on lagoon
shore some peculiar dry
scars, very abrupt and
even undercut on land
side, with a new bar on
lagoon side.

As Islet narrow
here, water vigorously
comes over and all down,
trees point toward bay.

low place with Memphis
that is bent down but
still alive.

Premna on beach ridge
beaten but sprouting

Large *Pseuderanthemum* is center in very sparse area, beaten down toward lagoon but still flowering abundantly.

Intsiz tree, slender, lying flat but sprouting several of these

(photos)

100

(photo)

On narrower part of island a sheet of pebble to cobble size fresh material is spread from seaward to a variable distance inland, stopping abruptly. From here landward is generally a thin layer of sand over a black soil. The sand is several cm thick but the old plants - *Thrinax*, *Polyphodium*, *Lepturus*, *Thrinax*, *Wedelia*, *Ischaemum*, *Sigesbeckia*, are able to persist for before storm. Also some *Morinda*, small *Pandanus*, a breadfruit ~~sapling~~, small sapling, small coconut.

A very few scattered large coconuts standing. Seedling of *Tournefortia* ^{unpeted} very common

This is Arno Atoll with some higher islands of this covered by dense thicket, not covered at all by sand. *Tacca* in these areas flowering.

Mangrove swamp in center of islet next to lagoon separated from it by a beach ridge filled in with gravel from landward side with an irregularly lobed very abrupt margin

1950

Several fairy terns
One white and one gray
Reef heron

Nine ~~species~~
~~Threes~~ ~~four~~ ~~five~~ zones -
1 Area near outer shore
where much material
has been removed, partly
held by coconut root mats.

1. Sheet of deposited medium
sized white material
in middle of islet, washing
lagoon in places.

2. Black soil covered by thin sand

3. Black soil, grassy, inundated
but not washed off

4. Area not inundated, protected
by mangrove swamp.

5. Area scoured clean on
lagoon side.

6. Unfilled mangrove
depression.

7. Delta in edges of lagoon

8. Rubble tracts on seaward
reef flat.



old prop 19

Plumeria rubra

One small tree at old
house site in area near
mangrove swamp not
inundated - tipped over
leaves, but flowering.

Vernonia cinerea

A few mature plants seen
on grassy spot not covered
by sand or scoured.

Fimbristylis cymosa

Rare or absent in scoured
areas, common & abundant on
areas where soil is thinly or
not at all covered by sand or
gravel. Recasted scoured
~~area~~ Also around mangrove
swamp and on lagoon bank
ridge in south end

→ Rubble tracts are opposite
scour channels running
from lagoon toward sea.

Sheet of deposited material
carried lagooward
and dropped, covering
soil surface.

Several blue-tailed skinks seen
in lagoon end of south end

24

1998 Marshall Is

April 25 - Megajato Islet

39422 *Nephrolepis aculeata*
common on tree trunks in
mangrove depression

2 23 *Pseuderanthemum canthium* seem.
periwinding around former
house sites

2 24 *Pseuderanthemum canthium*
var. *atropurpureum* (Bull) Fosb.
(same)

2 25 (moss)
on base of coconut trunk

2 26 (moss)
same

2 27 (moss)
same

2 28 (moss)
on tree trunk in mangrove wet

2 29 (moss)
same

2 30 (moss hepatic)
same

2 31 (moss hepatic)
same

2 32 (algae)
same

Palau atoll

25

Rhizomes and roots form
large masses. Branches
drooping
abundantly, flowering
after being beaten by typhon.
Flowers white, leaves
edge leaves green
Same - leaves purplish,
flowers crimson, dotted
browned by submergence
in salt water during typhon

April 26 - Boat trip to Elizabeth I. from Fabo.

Jaluit I. the density of standing palms very low southward to beyond Foreytown and then for a considerable distance there are none. Then about half-way there are a few for a considerable distance, the density gradually increasing till in the last $\frac{1}{5}$ there is no appearance, from a distance, of any damage. At Malengi there is some damage but not much water came over here to 200-300 ft at most. This section is the part where the reef lies more or less east and west. The sudden increase in greenness is just where the islet bends.

All islets on south reef from Jaluit to Elizabeth and westward have same appearance of little damage, viewed from the lagoon. Elizabeth has thinnest appearance except for the sand on west of Jaluit I.

April 26 (Elizabeth)

No water damage on this islet but wind damage severe.

Many trees blown over or snapped off, mostly toward east or somewhat south of east or somewhat north of

ground vegetation scarcely affected except for following a browning of leaves.

Breadfruit shows every degree of damage from being completely thrown and killed to some that are not much affected and have $\frac{1}{4}$ - $\frac{1}{3}$ grown fruit.

Most standing breadfruit trees have most of smaller branches removed and small leafy shoots appearing on all parts.

Those broken off a few feet above ground have the most luxuriant development of leafy sprouts.

Blue-tailed and black skink seen. Small flock of flocks seen. A few common noddy on lagoons.

Plants seen on Clay belt

Pandanus tectorius
Artocarpus altilis
Calophyllum inophyllum
Lepturus repens
Physalis angulata
Fimbristylis cymosa
Centella asiatica
Carex papaya
Polypodium scolopendria
Crinum sp.
Tacca leontopetaloides
Morinda citrifolia
Fragrostis amabilis
Premna obtusifolia
Musa nana
Vigna marina
Elettaria indica
Hymenocallis littoralis
Zonophyllum globosum
Mirabilis jalapa
Zygotea sp.
Portulaca oleracea
Hernandia sonora
Alocasia macrorhiza
Trumpetia procumbens
Pteris tripartita
Phormium involuta
Penstemon aculeata
Druonconia conjugata
Careya filiformis
Clerodendrum inerme
Digitaria pumila - microbache
Plumeria rubra

Citrus aurantifolia
Nerium sp.
Polygonum scutellare
Hippeastrum puniceum
Canthium sagittatum
Zephyranthes sp.
Cucurbita sp.
Canna sp.
Leucaena glauca?
Nephrolepis antipolis
Nephrolepis biserrata
Codiaeum variegatum
** Cyperodon dastylus*
Asplenium nidus
Pseudanthrenium
Carruthersii (green)
Guettarda speciosa
Allophylus timorensis
Euphorbia chamaesyce
Wedelia bipinnata
Scaevola sericea
Tournefortia argentea
Cordia subcordata
Terminalia samoensis
Pociharia tetrandra
Entsia bijuga
Canavalia macrocarpa
Thunarea involuta
Zelouga ulei
Crinum grandis
Lepturus argenteus
Proso pedunculata
Vitis elongata
Peperomia

All tree species suffered considerably from wind. Some of every species observed, except *Calophyllum*, were blown over. All had broken trunks and were defoliated.

Small mangrove depression on south side near outer beach - *Lemphia*, *Bruguiera*, ground edge *Allophylus*, *Intsia*, *Personia*.

Much debris and dead trees.

Large pool, west end filled with *Enteromorpha* forming blanket over mangrove roots
Patches of *Bruguiera* (photos)

South end of island much more luxuriant than other parts, not so much damaged by storm - many breadfruit trees not much bent, but *Pandanus* mostly knocked down. Coconuts less damaged than elsewhere (photos)

Pandanus suffered more than any other species - most of the trees on the island being broken off, largely 2-3 m. above the ground. Most have at least some branches with green leaves.

Around the outer end of the island is an enormous old boulder ridge, very high, well vegetated. This encloses a small mangrove swamp.

Calophyllum along lagoon beach scarcely affected by storm. On northwest side the leaves are battered, a few trees uprooted.

Trees of a number of kinds, including coconut, breadfruit, *Calophyllum*, if tipped over but with roots on one side still in ground, continue to grow.

A few trees still have good coconuts on them, including one that was blown down.

measured
April 26 (Elizabeth) ?

74433 *Portulaca oleracea* L.
along paths in inhabited area

5 34 *Centella asiatica* (L.) Urb.
in inhabited area common.

5 35 *Neurolepis hispida* T.
in open north end of coral rubble

3 36 *Terminalia samoensis* Rech.
rare on east end

37 *Intsia bijuga* (Colbr.) Ktze.
local on east end

4 38 *Euphorbia chamaissoides* Boiss.
common on lagoon beach, ridg

4 39 *Canavalia micracarpa* (DC.) Piper
common on east end of islet

Emp chm - "berani" & "peran"
Constipation - drink as infusion
or either hot or cold water.

Centella "manuka"
constipation use infusion.

Terminalia "ebung"
used to cure pains and diarrhea.
drink infusion made with
hot water.

fleshy, prostrate, forming
a loose mat 4-5 dm. across,
flowers yellow
forming large dense
mats, stolons superficial,
fronds erect

shrub 1 m. tall, stems
sprouts from old stem
sterile
stems spreading, somewhat
ascending, glands
circular, thick, yellow,
wax, flowers rose pink.
"marlap" used for medicine,
for headaches and pains.
When a person is too thin
and wants to get fat - squat
the plant in water, pour
it. then bathe with water.

"Portulaca" - "marmilyan"
drink infusion for
many troubles

Intsia "kubuk"
long ago when young people
want to marry and
after a while repeat
wounds. They drink water
in which this has been squeezed.

34 8/1958 Marshall Is.
 39440 *Nephrolepis biserrata*
 common on rocks and rubble
 41 *Nephrolepis acutifolia*
 common on coconut logs
 and stumps (also epiphytic)
 42 *Plocis pedunculata* (Forst.f.) Wedd.
 common on bases of
 coconut trees and on coral rubble.
 43 *Peperomia* ~~var. 20~~
 common on coral rubble
 usually shaded.
 44 *Vittaria* ~~var. 20~~ Cey.
 rare, epiphytic
 on rotting wood
 46 *Schizoplyllum* common
 common on dead wood
 47 (lichen)
 on coconut log
 48 lichen
 on coconut log
 49 (lichen)
 on coconut log
 50 *Enteromorpha*
 very abundant in large
 mangrove depression
 51 (blue green)
 common in mangrove
 depression, on sheets of *Enteromorpha*
 52 (blue green)
 common on knees of
Braguiera in large
 mangrove depression

Jaluit atoll
 ponds erect
 ponds erect, large
 masses,
 stems as much as 0.8 m.
 long, curved at tips;
 sterile.
 fleshy.
 ponds pendent
 forming sheets, floating
 at high tide.

39453 (pungo)

grub upon ground

50 *Cocos nucifera*
on outer beach ridge

Apr. 27 - Jabor, Sabut I.

in ~~old~~ experiment station

grounds devastated by typhoon

55 *Ipomoea littoralis* Bl.

very local, near beach

56 *Lispalum wagmatum*

abundant around salin pond

57 *Peperomia pellucida* Sw.

on coral gravel

58 *Ventella repens* Forst.

common on coral gravel

59 *Digitaria pumila* var. microcarpa
local on coral gravel

Apr. 27 - Sydney town,

Sabut I.

60 *Ipomoea tubig* (Schlecht.) Bon
common on embankment
around old tanks.tree 14 m tall, thrown down by
typhoon (This mutant form
also known from one tree on
Majuro, where the nuts are
known to be sterile).prostrate, flowers purple,
darker in center.
sterile

fleshy

prostrate, flowers white;
appeared after bananas were
brought from Kusaie and Ponape.
decumbent & ascendingextensive vine, flowers
white, opening in evening.

Apr 27 - Fabr, Faauit I.
 Plants surviving in
 old botanical garden and
 experiment station

a *Stachys apetala javanica*
 a *Blechnum poposanum*
 a *Euphorbia thymifolia*
 l *Dentella repens*
 l *Cyperus compressus*
 lcp *Scindapsus avenus*
 op *Ficus elastica*
 a *Leucaena glauca*
 c *Vernonia cinerea*
 r *Hedysarum biflor*
 np *Erythrina variegata*
 la *Lepturus repens*
 a *Gutierrezia secundata*
 c-a *Pithecellobium microphyllum*
 a *Physalis angulata*
 a *Phyllanthus amarus*
 c *Ptilocarpus olereace*
 c-a *Amaranthus viridis*
 c *Euphorbia hirta*
 a *Elevainia indica*
 l *Morinda citrifolia*
 lc *Cyperus byllineus*
 c-a *Cyperus zizanioides*
 c *Urginea maritima*
 rv *Sebiba pentandra*
 cp *Pseuderanthemum canescens*
 cp *and va. atropurpurea*
 cp *Acalypha amentacea*
 v. *volkensii*
 cp *Artocarpus altilis*

a *Polyscias pinnata*
~~Pholidoscelis (adult)~~
 u *Glycine max*
 l-p *Cerbera manghas*
 l-c *Alocasia macrorhiza*
 r *Inocarpus fagifer*
 c *Eragrostis amabilis*
 c *Cenchrus echinatus*
 l-c *Lynnedochia nodiflora*
 r *Brassia actinophylla*
 l-p *Sansevieria zeylanica*
 or *zeylanica* (wid-leaf)
 op *Rhoeo*
 op *Terminalia catappa*
 op *Ficus elastica*
 op *Casuarina equisetifolia*
 r *Hippobromus longiflor*
 np *Cyperus circinalis*
 lc *Leptospermum heterodon*
 np *Ficus tinctoria*
 cp *Culocaria esculenta*
 ls *Xanthosoma sagittata*
 l *Tournefortia argentea*
 lo *Euphorbia prostrata*
 l *Musa*
 l *Cremna obtusifolia*
 lc *Sporobolus per. capra*
 lc *Pleuropeltis nodulifolia*
 a *Carica papaya*
 lc *Gomphrena globosa*
 o *Crinum sp.*
 c *Hymenocallis littoralis*
 l-p *Cordyline terminalis*
 c-a *Fimbristylis cymosa*

- a *Thunbergia involucrata*
- cc *Digitaria pruinosa*
- c *Pandanus tectorius*
- ca *Wedelia bipinnata*
- d *Pomphallis acidula*
- ea *Paspalum vaginatum*
- ea *Bruguiera conjugata* (dead)
- Albizia lebbeck (dead)
- g *Canna* sp.
- g *Asplenium nidus*
- g *Sporocea littoralis*
- l *Clerodendrum inerme*
- ll. *Hibiscus esculentus*
- Clausia aurantiifolia
- Citrus maxima (dead)
- Citrus sinensis
- Citrus bergamia (dead)
- Cassia occidentalis
- Cucurbita pepo (dead)
- " maxima (dead)
- Cucurbita sativa (dead)
- Citrullus vulgaris (dead)
- g *Zephyranthes rosea*
- g *Agave sisalana*
- g *Cyperus rotundus*
- g *Delonix regia*
- g *Coccoloba*

Flock of turnstones around
small pond
several fairy terns
One molly

Most of the trees in the
experimental station are
battered wrecks, but
with new shoots coming
out of trunks. Pandanus
many of them broken off
and killed but also
many with living branches
remaining. Some of the
trees, such as Tamarindus,
Ceiba, Terminalia, Casuarina
are lying down and sprouting

Herbaceous plants are
growing luxuriantly,
forming a complete group
over. *Crotalaria* is the most
abundant but Amaranthus,
Chrysanthus, Cyperus, javanica,
Blechnum, Physalis, Eleusine
glauca are all abundant.
Leucaena glauca very
abundant in some areas.

Crotalaria was spread from
small patches over the entire area
by MacKenzie. Present plants,
flowering and fruiting, are
subsequent to typhoon.

Apr 27 Joluit I. south
of Joburia to beyond Sydney Is.

(photo) flingile ridge on outer
reef flat has by most
places become lower and
more rounded than it
was on Apr. 21

Some fine material
has been moved shoreward

On reef flat between this
and shot are scattered
boulders, but all are
old blackened ones

The combination of
Acropora slabs is all
with dip seaward, even
down in ridge

The main problem
to account for the
amount of rounding
is to see the slab like
Acropora is mostly
broken with edges of
breaks rounded off.
The Porcellipora is mostly
brown but with the tubercles
broken off some lagoon
type Fungia scattered
with material. Occasional (photo)
slabs blackened on one
side but greater part of
material that is above
high tide is white

Along both seaward
and lagoon side the
conglomerate platform
is being peeled off of
a rather smooth, steep
old abraded surface.

(photo) sloping gently toward
sea and very gently toward
lagoon. Platform not very horizontal.

In one place on lagoon
side this has evidently
been uncovered recently
as it is not yet case-hardened.

On lagoon side is a
wide belt, mostly a
consolidated surface, in
places covered by thin ground
that is 1 m or so lower
than the general islet surface
and shelves off into the
lagoon. This is all much
discolored by algae and
may be all covered by high
tide. No vegetation on
this except algae. On
slightly higher ground
is Lemphis

(photo) this lower surface
extends in long lobes
or channels into the
islet. Low cliffs at head
of these channels.

Turnstones occasional
in small groups along
seaward reef to a few
tattlers.

One white and one blue
reef heron. Two blues and
one white around old tank
perhaps including same as
one embankment across

old tank. Turnstones,
Jacanas, Pandanus,
Cocks, Wedelia, Vigna
in a 'burnland'. The trees
very badly beaten by
storms. Porous tuba

One white heron with
a few black flecks.

One woddy. One New
Zealand creeloo.

South of ~~the~~ ^{approx} about 200-
240 m. a channel cut
almost through the islet
to a depth of about 2 m. - 2.7 m.
curved, obviously artificial.

This goes into a compact
layer which corresponds
to the abraded surface
mentioned above. On this

are two separate layers
of very coarse porosus
but very consolidated
material, each about 1 m. or
a little less thick, uninformable

April 20 - Pingelap Islet

Large semi-open area
back of village dominated
by Vigna.

Fallen breadfruit and
Pandanus knocked down
by wind - toward south
or slightly east of south.
Further west in coconut
area many coconut trees
down pointing 65-75° east
of south. Some 70° or 80°.

Many snappy off 3-4 way
up. Some small trees knocked
down.

A few coconut trees lying
pointing directly south.
These crossed by those
pointing east and north
of east and south of east.

The grasses and Vigna
much more luxuriant
here than seen anywhere
else on atoll.

Fallen breadfruit spades
disiniantly. Majority seem to be down
in no atoll soil in
interv.

Young Pandanus planting
not damaged at all. Large
Pandanus practically all
broken off well above ground,
a few tipped over.

Plant seen

Tragafetia
Coco
Cleusine
Lepturus
Catharanthus
Pandanus
Calophyllum
Canca
Artocarpus
Euphorbia hirta
Eragrostis amabilis
Asclepias
Hymenocallis
Zimbrystylis
Paspalum conjugatum
Alocasia
Morinda
Teca
Vigna
Asplenium
Polypodium
Phyllanthus
Citrus aurantifolia
Hibiscus trilocatus
Nephrolepis hirsutula
Copturus
Ficus
Cucurbita maxima
Wedelia
Pteris
J. leucos
J. marcescens
Allophylus

Digitaria
Cyperus javanicus
Solanum nigrum
Cinnamomum
Acadaphis amaranthi
Polyscias trinervata
Cedrela odorata
Cassia thea
Terminalia camansi
Scaevola
Physalis
Centella
Euphorbia characias
Jernonia
Euphorbia prostrata
Psidium guajava
Psidium guajava
Lyndellia
Cluneria
Ipomoea littoralis
Guettarda
Cordia
Myrsinaceae
Echinocloa
Cyperus odoratus
Eleocharis
Colocasia
Drimys
Ocimum sanctum

A few fairy terns and
noddy sea flying. Blue
tailed shrike common.

One golden plover
nahs coconut tree
along lagoon beach down
about 10° E of N.

Breadfruit grove has
many trees standing
but most branches
broken off trees nude,
3 or 4 m.

Most of coconut trees
down in part of?
pointing east to southwest
Here are enormous
number of seedlings
of Sipium on bare
ground. Dark thorns of
large tree pit near
north end - perhaps 2 m.
Reports a good stand
of Cyrtosperma fruit
plant small, leaves
not over 3-5 m. tall,
yellow. Parts almost
bare, parts taken over
completed by Pandanus
and Cyperus.

Another, pit north of
this in lagoon, has less
Cyrtosperma much dead
Pandanus. A very little
Colocasia no Sabicea

little Cyperus. Several
small dead Bruguiera
small mangrove
swamp. Several Bruguiera
about 1 m. tall, ~~but~~
partly surrounded
by dense tangle of
Hibiscus tiliaceus
about 4-5 m. high
Hibiscus not much
affected. Most of
Bruguiera killed -
not sprouting - no
se were any seedlings
seen. Said to have
had 1-2 ft. of water
before typhoon, now none
During typhoon lagoon
water came in about
deep, depositing great
quantity of coconut husk
bits, bark, leaves, etc
in edge.

A few of Bruguiera have
some leaves - near type.

Other bird in coconut tree
being attacked by 4 noddy
several woodpecker
tattlers, one two turtledove
plover seen. Turtledove
in pit.

April 23 - Pinglap Islet
in semi open ground back
of village

39401 *Hemigraphis repanda* (Forst.) T. And
rare

62 *Paspalum conjugatum* Buz.
abundant
+ ~~Capreobis~~

63 63 *Euphorbia thymifolia* prostrata Ait.
abundant on open
ground around dwellings

64 in large tar pits
Echinodorus niger (L.)
abundant

65 *Cyperus odoratus* L.
common

66 *Eleocharis quadrangularis* (L.) Ait.
common in mud
+ ~~the~~

67 *Thalassia hemprichii* (C. Chr.)
Aitken

prostrate, ~~gorolla~~ purple
white, falling very easily
prostrate to ascending
with erect pointing
culms.

prostrate, purple

forming large many
culms ascending, pencil
drooping slightly
woolly clumped

tufted

Area to west of town pit
recently burned
present says pond surrounded
by *Bursera* & *Acacia* wood,
mangroves mostly alive,
leafy pond surrounded by
soft red mud, with white
species.

April 28 - ~~Jabon~~
April 28 - ~~Jabon~~,
Jabon

in Inhabited area, flooded by salt water during typhoon 3 1/2 months ago
29468 algae in old eastern

- 1 09 *Casuarina equisetifolia* planted
- 2 70 *Euphorbia trigonifolia* L. abundant in paths
- 3 71 ~~The~~ *Cardiospermum* ^{*Naukurtium*} *parviflorum* (Forst.) C. E. Sch. local in old experiment station
- 3 72 *Plechium papa-midation* Ormei abundant locally
- 3 73 *Amaranthus viridis* L. weed
- 3 74 *Cyperus compressus* L. weed along paths
- 4 75 *Solanum nigrum* L. common weed in
- 3 76 *Stachytarpheta jamaicensis* (L.) Goldi common weed

tree 12 m tall, badly
battered by storm
prostrate, olive green

bunched herb to 0.8 m. tall.
spreading tufts.
bunched herb 1 m. tall,
flowers white.
erect herb 0.7 m. tall,
bunched; flowers blue violet.

1947) *Cyperus rotundus* (L.) Gaertn.
common weed

13 78 ~~Sta~~ *Crotalaria incana* Kb.
very abundant

7 78a *Cyperus ~~confusus~~* rotundus L.
common in paths in village
Saw. N. Y. Cachos around
old experiment station.

west, up to 0.8 m tall,
flowers yellow, no
brown lines.
bulbs deeply buried, leaves
spreading

April 29 - Islet in channel
n of Jabora - from lagoon
appears to be sand & gravel
with what may be rock
at just above low tide level
in about 3 places on lagoon
side also on north side
along channel. All around
is high beach above this.

1 Apr 29 - Ribbon islet
Cannabis (seeding)
 Plant *Pemphis*
Scaevola ~~topsides~~
Passia
Guttada
Barringtonia (medium)
Glycine
Cocos
~~intra~~
Spedelia (seeding)
sunfletta (seeding)
Sporodes pescaprae (seeding)
Ypona (seeding)
~~Opuntia~~ ~~hawthorn~~
Polypodium scolopendrae
Molinia ~~seeding~~
Vittaria
Nephrolepis acutifolia
~~T~~ *unifolias*
Pandanus (medium)
Ternaria (seeding)
Eleocharis (seeding)
Septaria

Blue-tailed shrike abundant
 13-20 frigate birds
 5-6 noddies (or white tipped)

3 large *Pisonia* trees
~~topsides~~ were knocked down.
 18 *Pisonia* of coconut, guettarda
 knocked down ^{on} ~~on~~ ^{on} ~~on~~ ^{on} ~~on~~
 south, also 2 *Tomopteris*
 along ^{on} ~~on~~ ^{on} ~~on~~ ^{on} ~~on~~
 1 *Pisonia* in middle
~~in~~ ^{1m}
 High beach ridge, 2.5-3 m
 on lagoon side.
 16 coconuts standing
 1 broken off
 6 knocked over.

Beach ridge surrounding
 rock-bottomed depression
 seaward side was well
 vegetated, was pushed
 about 3-4 m. into depression
 plants bent down toward
 depression, pointing "W" of C.

Depression crossed by a low
 eroded beachrock or striking
 35° w of S. dipping $\frac{1}{2}$ to 1 m

Low sharp ridge, crescent
 shape, around S. side

enclosing a crescent shaped depression about 8 m. wide, filled with trash, outside of vegetated ridge

Leucosia seedlings numerous especially on root masses of Asplenium.

Mangrove root masses of Asplenium lying around where torn off of trees, but many times as many more in central depression unless they are attached with fronds growing upward in place. This dominant up to bottom of ridge.

On side of islet toward pass there is a consolidated bedrock just above low tide level, extending with a small high bank of newly washed material. The ridge that extends to this is slightly above the general level, has been newly abraded and is white. The part of the general surface that is enclosed and forms the bottom of the depression is gray and shows little evidence of abrasion.

It has a sparse growth of small *Pomphis*, 1-1.5 m. tall, not damaged by storm. Though several trees along inner side of depression are tipped over and much debris is piled up on the inner ridge.

Pandanus and *Ochrosia* fruit abundant but *Ochrosia* not germinating and *Pandanus* very rarely.

Cordia and *Leucosia* seedling common, also *Gnettarda*, and locally *Morinda*, *Flevya*

Lepturus a few patches in open places.

Flevya local in one opening.

Leucosia abundant especially on beach ridge. *Gnettarda* and *Aeg. bonin* (Portia) somewhat less so. *Pisonia* everywhere but sparse.

Polypodium common in interior. *Nephrolepis* mostly almost dead but some sprouting.

Island has two horns
projecting lagoonward,
the southern at least
from a plain - a bar
of the reef bar
The reef bar

part III (Kings)
plants
Bittern seed
Mounds
a *Calophyllum inophyllum*
a *Lycopodium*
Musa sapientum
Cyperus rotundus
Arthrostachys lancea
Zygophyllum roseum
Cuphea lutea
- *Lepturus repens*
- *Kalanchoe pinnata*
a *Pedicia biflora*
Cordia
Amaranthus viridis
Vigna
Hibiscus tiliaceus
Canna
Alocasia
Bougainvillea spectabilis
(abundant, no variety)
Pseuderanthemum ciliatum
- *var. atropurpureum*
Fimbristylis
Fuertaventura
Trees

Trumpetta
Physalis
Clemencia
Cunia sp.
Nephrolepis hirsutula
Calophyllum
Thespesia
Gliricidia
Filea
Taedynedrella
Crotophia amabilis
Digitaria pumila & *multiflora*
Glechoma hederacea
Trifolium
Adenostoma
Allophylus
Aphyllon
Nephrolepis acutipolia
Pomoea tuba
Bruguiera
Intsia
Cannabis microcarpa
Gunnera
Cassytha

Photos from about 1/4 m
roll 4 (1-3 m of runoff from
lagoon)

Coconut large Morinda
knocked over toward lagoon
Coconut broken off and
lying toward lagoon
All pointers almost
directly south
One *Calophyllum* in ^{up} ~~down~~ lagoon
pointing away from lagoon

Judging by debris, perhaps
somewhat came in from
lagoon

Many breadfruit seedling
not far from lagoon beach

Large Breadfruit tree 10 m in from
lagoon has branches broken
off and thrown toward lagoon,
also mode of break indicates
that force was from seaward.

In interior a very thick
growth 1-2 m. deep, of
Medelia, *Vigna*

Pandanus more less
broken

In interior tree thrown
mostly to south, some a much
as 30° east of south, one of the most

One coconut tree pointing north
beyond about the middle of
the island practically all fallen

tree point 30-50's of south
and all read part tree are
knobbed down. Most bottom
boulders broken. Allophyllus,
larger on down.

From about middle toward
cayman on Anna Maria soil
from down on, gray, though

locally, just south of
swamp, are several
coconut and Pandanus
down pointing north west
though most are just
the opposite.

if so, no open base
hot on alluvia soil
are abundant. Lippia
seedlings.

swamp - a small
depression with black
red peaty, gray soil
water almost fresh, only
a few inches deep, smelling
of fish, mud soft right
about water, but not so.
Much coral in soil well
more, probably washed
in recently.

No mangrove seen but
Hibiscus tiliaceus abundant
not however, mostly forms
as dense tangle as usually

top of all on land. 65
soil. On seawards side
and in more open areas
very chlorotic.
Seaward side of
this shows every sign
of inundation and
deposit of much ash

seaward of ~~the~~^{many} and
separated from it by
a wide ridge, is a
crescent shaped
arrangement of large
mangrove depressions
with long brackish
water, and great stands
of Bruguiera and a
Hibiscus. The Bruguiera
mostly has the top
dead and especially
in the most seaward
part.

In the inside of the
crescent is bright green
consolidated. On this
almost all palms are
down, mostly pointing
about 45° east of south, but
some to 75° to the west, and
on top of this are

along coast again
but least of mangrove
depressions, separated

der ridge.
Highest part of platform inside crescent bare and apparently phosphate. (sample 5) The black soil is probably *Nicoria* m.s. but no *Nicoria* left. *Morinda* and *Allophylus* common. *Pipturus* seedlings abundant. Coconuts and Pandanus largely knocked down.

Just inside beach ridge and outside mangrove is a pond with only a few mangroves, obviously partly filled in by fresh rubble removed from beach ridge. Many dead uprooted Pandanus and *Thespesia* trees in it. All fallen trees pointing directly inland more or less due south.

East half of this pond almost filled in with beach ridge debris and trees + trash.

Ground on coast toward young trees are lying pointing 70° n of south. Mangrove up to beach ridge.

little damaged
In indentation on side
toward young mangrove
open area back of house
covered densely with *Lepturus*,
Lepturus, etc. young
coconuts a year or old.

Water sample from well
99' from beach ridge, 130' from
low water mark.
Appr. 6' deep. Water fresh,
sl. turbid + iron taste.
Well covered with silt.

Small flock of noddies,
both kinds, 2 fairy terns,
1 wandering tattler.
Grenit saw a pigeon.

2 black skimmers.
Blue tailed skimmers common.

Apr. 19 - Inny I.

Plant

Trombicula
Musa
Spathiphyllum var.
Canna sp.
Artoxarpus altiss.
Eleocharis
Cyperastrum
Mirabilis
Cucurbita sp.
Wedelia
Lepturus
Polypodium
Craspedos amabilis
Cortollo
Burmeistera
Gnidia glabra
Gymnophyllum telandiae
Reseda
Burmeistera
Nephrolepis acutifolia
Nephrolepis hirsutula
Cordia
Tournefortia
Pandanus
Cassytha
Tacca
Digitaria
Schefflera
Ochnosia
Guttarda
Ferns

Cladodendron inorn.
Asplenium
Lepturus (seedling)
Blugiuina
Buntingtonia aristata
Vigna
Alocasia
Carica
Cortulaca oleracea
Turneraria
Cucurbita maxima
Hedysarum biflor.
Psuderanthemum canthium
 var. *atropurpureum*
Hernandia
Calophyllum

Two
it ~~is~~ ^{was} north end of
village tree has fallen
25° w of south

1 golden plow
panniers of 6 photos from
west of ^{island of}). Photo of lemon beach
2 instant from samples, 1 a. ad.
Breadfruit seedling
in open grassy area
at w end.

Locally Thurea leaves
are brown - salt water?

Phosphate area ^{interior of} is, ^{island} end
is extremely rough and
piled with boulders, as
though they had been extensive
solution and collapse. Perhaps
rare. Phosphate must have
been 2-3 ft thick. Some dark brown
mud large white weathered pieces of coral
+ many ^{embed} depressions

but with coconut trunks,
mangrove trunks etc.

Still has small red atyid
much sand in bottom.

W. A few mangroves left,
all large ones dead
medium ones (1 m) dead at
tops small ones healthy.

Beach ridge shifted
in W edge of depression,
stopped abruptly, burji

coconut. Other trees

1 Large Ochromis which had
down into mangrove
swamp, pointing 60° n of south
large Barringtonia badly
beaten up, between
mangrove and sea.
Many seedlings under it.

On north end of mangrove
depression bottom is rock.
Evidence of solution, channels
and deep undercutting.
Rock stained red-brown.
Water almost as salty as sea

Deposit of white coral
pebbles + cobbles seaward
of depression very flat
topped. Top about 2 m.
above water level at low
water

This deposit continues
eastward with an
abrupt lobed margin
varies from about 30 to 60
m. in width, perhaps
1 m. above general level of
island. Material mostly
rounded, small gravel to
cobble size.

More coconut trees down than
standing here. Quite a

hodgepodge of directions but most 20° - 30° s of s. than any other way, a few just opposite this. Left Bannington tipped over landward.

Large rubble tracts on seaward reef.

Inland in west third of island the general ground covers a lawn of *Thurawa* and *Lepturus*, some *Wedelia* badly eaten by insects. Water may have come over here but left few traces, little trash.

In center third much water obviously came over. Enormous piles of trash, mud, gravel, etc. Most of coconuts and other trees are down here, mostly pointing from 20° s of south to 30° e of south.

Soil has been largely either covered up or leached away. *Fleur de lis* very common just west of ^{also old totally so.}

On East end has been even more affected, rubble being deposited

almost to the lagoon shore. Most of trees down East End V has not had much water across it but some many trees are down mostly pointing south or a little west of south, but a few point north. More standing trees here than elsewhere on islet.

In slight ~~steep~~ recess on lagoon side there is a tiny gravel ridge at top of beach, then a cobble to boulder beach, rather wide, then just exposed at low tide, a wide sand flat, fine sand, suppled surface (sample 19) in, is about 15-20 cm. deep gradually thinning westward till a few tide level pitted rock platform is exposed. Then along shore for about 200-300 m. a ^{1/2} *platfrom* is exposed below a gravel ridge 1.5 m. high.

Apr. 30 - Lejroh Islet.

Brown booby flying over lagoon, very dark phase.

Hundreds of frigate birds, thousands of noddies, predominantly white-capped, a very few fairy terns, many boobies, mostly brown in various stages.

Coconuts, ^{coconut} *Intria*, large *Pisonia*, to 1 m. + were down down, pointing approximately south.

Many germinated coconuts at top of beach.

Interior of islet was a *Pisonia* grove with a few large *Intria*. Now the *Intria* and many of the *Pisonia* are down. *Pisonia* is sprouting vigorously, *Intria* less so. *Pisonia* that are standing have most of branches broken off, but are sprouting very vigorously.

around periphery especially on north side at Townferry, and Terrierabu. *Terminalia* especially common + leaves. Many coconut seedlings, several small patches of *Lepturus*. On N.W. extension of islet a pure stand of *Pemphis*, much beaten by typhoon but mostly still alive. Here the substratum is a pitted very dark gray artificial platform.

1000
1800
1700

4 crested terns. Wien saw a small flock of boobies.

New Zealand cockatoo. *Pisonia* flowering and fruiting vigorously.

much sand washed inland mixed with humus - probably normal condition before typhoon, as very little phosphate rock found, only a little immediately around base of large tree. Tree holes with water but no crustaceans or insects.

1-2 inches of sand over humus on north side.

plants

Celophyllum secundum
Bunya tree ()
Guttarda ←
Lisoma
Cordia
Terminalia sandwicensis
Turnepotia
Asplenium
Portia
Coco
Leucaena
Lepturus repens
Canavalia (medium)
Vigna ()

White-capped noddy nesting in abundance, about 60 nests with egg or downy young visible from one position in a fallen Interia tree, nests obviously built after tree had fallen. Many above Turnepotia and Lisoma.

Long curved sand bar on east point of island, curved like sickle toward outer reef. short one on west point, also curved same way east of island a

long reef about 100 m. on
 west side main
 atoll reef, enclosed
 lagoon open at both
 ends.

Large shallow
 area lagoonward of
 islet and stretching
 far to south.

White-capped noddy nests
 very compact, made up
 of *Lisoma* leaves, possibly
 stuck together with cement
 from appearance, but this
 not investigated. Apparently
 adult birds sitting by
 nests, allowed themselves
 to be handled, possibly
 young not yet flying.

Apapt. 70 - Mejatito 9.

Well about 18 m. from sea
& deep through rubble
the entire way.

Coconut roots from coarse
black soil layers all
the way to bottom, becoming
sparser downward.

None in overlying layers.

Two overlying layers -
top one 7", no frame

Next layer, with fresh
frame, 2 1/2"
Soil layer black and
filled with roots.

Under this rubble with
decomposed frame. 4.7

Then over the deposition sheet.

Other well in bottom
of depression, uniformly
dark gray 3.6 water well
about 1 m. 1/2 do.

It ends near small
sharp cobble ridge
along seaward side.
small depression back of
it 2-3 m. deep then
rises to top of fresh
rubble sheet.

This spreads inward,
little elevation here
except near shore, very
evidence of strong flow much.

Portulaca oleracea

Passerina coccinea setting about
Medicago vines

Amaranthus *Digitaria*

Lepturus *Vigna*

Asplenium *Cladonia*

Isosoma *Physalis*

Tacca *Alpinia*

Limbostylis *Procarpus*

Morinda *Calophyllum*

Pterophorum *Siparuna*

Rubble sheet thinnest
inward and ends probably
100 m. or more in. but evidence
of flow of sea water continues
upward.

Depression with brackish
water.

Several tall standing
Isosoma inward from middle.
Don't before these are evidence
of deposit of brackish

Breadfruit on seaward
mostly dead ~~now~~ some
nearby is

Inner side may have
been covered by salt water
but little evidence.

Erosion from lagoon side
has cut away soil in
places.

Trees mostly pointing toward
lagoon but in places covered

Apr. 28 (Pinglap).

39479 (fungi)

on bark of dead breadfruit tree

Apr. 29 - Kinijong I.

80 *Entzia bijuga* (colebr.) Kze.
edge of forest inside outer
beach ridge2 31 (algae)
open sand inside same
lagoon beach ridge
ribbon

Apr. 29 (algae).

2 34a *Leucophanes*
at base of coconut tree

April 30 - (Rejroh) I.

3 32 *Pisonia grandis* R.Br.
dominant tree in vegetation
of islet.33 *Pisonia grandis* R.Br.
same.May 1 - (Jabor
Island) Jaluit I.1 34 *Vernonia cinerea* L. Less. var. ~~panniflora~~ (Bl.) DC., flower purple
very common after typhoon
- flooded area1 35 *Ageratum conyzoides* L.
very rare just above beach

small tree

dense cushion, perhaps
whitened by insulation
24 months earlier by saltwater.low tree with massive
trunk, flowers pale green.

same

flower purple

flower white

May 1 - Hydneytown

Cut across inlet
cut into a compact layer
extending across inlet
but becoming more rubby
seaward. Well consolidated
but not case-hardened

Then a rubby layer
weakly consolidated
can be pulled apart with
picks. Top very flat.

Judging by algal growth,
the top corresponds with
high tide, layer is about
2.5' thick - somewhat more.

Has intertide partly filled with风化
over this is a variable
layer of rubble 1-4' thick
to 3.9' at highest point
near seaward side. This
has little or no fine material.
It is weakly consolidated
at least near cut. Here
it shows some fluvial
deposition. May be loose
away from cut.

Barker points out that
this middle layer may
be like the sheet deposit
on Megal to and could be
consolidated because
between tides.

width of inlet from
inner edge of beach at
is 115'

Levels taken with respect to ridge to water level & top of top of middle layer		
0	0.9	7.5
1	0.7-0.8	7.9
0	0.5	7.3
0	0.9+	7.8
0	0.9+	7.7
1	0.4	2.3
Q	0.4	2.7
0	0.35	2.65

Top layer is weakly
cemented

Jabron - saw 17 crows
again.

Very high tide in afternoon -
many depressions filled
with water which came
up through bottoms.

The old Japanese tennis
court and one of the garden
plots were flooded.
Young excoyote, 4 years
a bit more, planted on
this garden plot flooded
by 4 inches of salt water.

May 2 - Slight for
Jaluit & Majuro
to have small bar exposed in main in
P.M. small bar exposed in main in
From hydro to my
small at first no
preponderance in
direction of fallen
coconut trees, then
gradually more
point seawards
but still not all
At corner of Jaluit I
a white rubble sheet
covers the east side
in & about diameter
of narrow part to
north. Change in
amount of vegetation
damage abrupt. Large
mangrove swamp
not much affected

Mangrove very much
around pond on Elizabeth,
more around pond
on next islet. These
not much affected
by storm.

Damage on small
islets toward Pingelap
greater than in area
between Elizabeth and
Jaluit I

A number of "secondary
lagoons" along west side
Also small bars on reef-
sum with some without
beachrock - pink in color
as if made of from sand.

Along west reef, especially
northward there seem to
be surge channels
both on lagoon and
seaward sides.

On islets north of Majuro
white rubble sheets cover
seaward $\frac{2}{3}$ to $\frac{3}{4}$ of islet.
Low vegetation remains on
lagoon side.

This pattern is perhaps slightly
less north and on east
reef then much less
damage.

Kwazulu Natal
Clouds

la Cyperus rotundus
c Lepturus repens
o Poaceae - grass
c Heliotropium californicum
c Indigofera pseudotinctoria
c Tornephilia argentea
c Euphorbia thymifolia
c Cocos nucifera
c Crinum procerum
1 Crinum asiaticum
c Cyperodon distylis
c Paspalum scrobiculatum
c Chrysopogon aciculatus
c Actyloctenium egyptium
c Thysanotus emarginatus
c Conchus securatus
c Stachys pfeifferi indica
c Euphorbia burttii
c Eragrostis amabilis
c Poides pilosa var. ciliolata
c Portulaca oleracea
o Vernonia cinerea
c Cotyledon sandwicensis
c Euphorbia prostrata
c Glechoma hederacea
c Trifoliate perennials
Hibiscus hybrid
Thlaspi perfoliatum pongam
Ipomoea triloba
c Jasplatura
c Grindelia jamaicensis
Pleurotus ostreatus

a Desmodium caeruleum
r Centella asiatica
lc Wedelia biflora
sc Heuchera sanguinea
sc Euphorbia heterophylla
lc Vigna marenii
c Pluchea indica
l Golipta alba
c Pandanus tectorius
Desmodium canescens
r Morinda citrifolia
Calophyllum inophyllum
Conocarpus edulis
Caryagratta piligera
Lavandula latifolia
Paspalum paniculatum
dilanthus tiliaceus
seuderanthemum acanthoides
m. strobipinnatum

By old timber
Peruviana only
Hibiscus ~~rosa-sinensis~~
Gardneria jasminoides
Psuedoanthemum ornithophilum
Tabernemontana coronaria
Codiaeum variegatum
Hibiscus sp. ~~schizopetalus~~
Alocasia macrorhiza
Pedicularis tithymaloides
Nerium sp.
Hedysarum sp.
Polygonia satellans
Hippocratea luteola
Melastoma hispidula
Ocalthys wilkesianum
Greynia nivosa
Polygonum trichotomum
Urtica (cumbida)
Angelonia angustifolia
Glycine australis
Pentas lanceolata
Sporonia elegans
Grapes *flabellifolius*
Psychotria *indica*
Psidia *myrsinifolia*
Myrsinodendron *leptophyllum*
Cyanea caerulea
Psidium *ananas*
Psidium *myrsinifolium*
Catharanthus roseus
Carica papaya
Passiflora edulis

Chrysanthemum latifolium
Lupinus *flavus* *spatulatus* ?
Cymbidium ?
Araceae *excellens*
Physospermum macrothecum?
Sindapsus annua
Eriemannia pinnatifida?
Hibiscus pulcherivius
Acalypha hispida
Vitis Tripolia
Ravenala madagascariensis
Artocarpus altilis
Anturium comosum
Asparagus sprengelii
Polygonia quifolii
Polygonia ~~multifolia~~
Calophyllum inophyllum
Strelitzia reginae
Russelia equisetiformis
Amherstia sp.
Rosoloba *viripes*
Polyodium scolopendria
Schinus terebinthifolius
Polandra sp.
Cordia sebestena
Thrinax *recisa* *albomarginata*
Cassia alata
Abies *forrestii* sp.
Glimicis *spinosus*
Tabebuia pentaphylla
Aristotelia *gymnothecia*
Ficus subquadrangularis
Cratoxylum
Hibiscus tiliaceus

Gloriodendron nov.
Bougainvillea L.
Hibiscus undulatus
Magnolia sp.?
Cratostoma
Terminalia catappa
Ceratonia siliqua
Quercus speciosa
Glycine probulosa
Fernaria nov.
Cocculus specifolia
Ephedra compactula
Hydrangea rotundata
Scandola speciosa
Loropetalum rotundifolium
Rhodopeltis speciosa
Ostrya oppositifolia
Pinus americanus
Citrus sp.
Melica biguge
Granaecium
Pentheria aculeata
Carica quadrifolia
Zephyranthes rosea
Muraya paniculata
Cayennea
Catleya sp. var. claudia multicolor
Decantia repens
Asplenium nidus
Begonia sp.
Pedicularis
Polypodium speciosa
Cyperus rotundus bigenic
Allamanda cathartica

Beloperone guttata
Crinum asiaticum

92

1948 Marshall Is.

May 2 - Delap Islet

Maguro Atoll

3948a *Destillea repens* Forst.abundant around edge
of airstrip

May 4 - Kwajalein Islet

Kwajalein Atoll

1 grassy ground near airstrip

3 37 *pondoa triloba* L.

very local, one patch seen

7 83 *Paspalum setaceum* Michx.

common

3 47 *Euphorbia glomerifera* (Willd.) Wheelercommon locally, ² *tochys* Rottb.4 90 *Cyperus rotundus* L.

local

1 91 *Pluchea indica* (L.) Less.

common

1 92 *Pluchea odorata* (L.) Cav.

common

4 93 *Pluchea*several plants in small
colony with #39491 and 394921 94 *Euphorbia manulea* L.

one plant seen

1 95 *Desmodium canescens* (Griseb.) Sch.-Th.

very common

1 May 5 - same

1 96 *Dactyloctenium aegyptium* (L.) Rikb.

locally common

1 97 *Cyperus rotundus* L.

locally common

Maguro - Kwajalein 93

prostrate, forming mats,
flowers whiteprostrate, flowers
reddish purple
spreading to ascending
erect, arching at apex
ascending to erect.erect shrub, branched,
4 dm. tall flowers white
shrub 1 dm. high,
flowers pinkish gray
prostrate shrub,
much branched, flowers
purple
prostrate, olive green
with spots in flowerscalms decumbent, spreading,
slightly ascending

3942 ~~lance~~
 1 *or* *Ophiorrhiza prostrata*
 3 49 *Digitaria ciliaris* (Retz.) Kuntz
 occasional
 3940 *Portulaca sauvagei* v. Rollin.
 locally common
 40 *Portulaca oleracea* L.
 very common

causing normally
 prostrate stems to grow out
 calyx somewhat exceeding
 prostrate, fleshy, flowers
 yellow
 prostrate, fleshy, brownish
 flowers yellow, about
 1 cm. across, stamens 10-12.

96

97

98

1943 Virginia

May 21 - Great Falls of the
Potomac

Rocks overlooking falls -

- c *Myosotis virginica*
- c *Rumex acetosella*
- c *Hedera americana*
- c *Lonicera japonica*
- c *Campsis radicans*
- Cerastium*
- Fragaria*
- Plantago lanceolata*

Open part of park

- Poa annua*
- Anthoxanthum odoratum*
- Betula nigra*
- Platanus occidentalis*
- Biriodendron tulipifera*
- Taraxacum officinale*
- Plantago rugelii*
- Stellaria media*
- Fallopia lyrate*
- Polygonum perfoliatum*
- Trifolium arvense*

99

Wooded flats along canal

*Stellaria graminea**Galium aparine**Thlaspi arvense*

Comptonia peregrina
of *Caesalpinia*,
from palmix

(saw)

- Betula nigra*
- Platanus occidentalis*
- Birius Torreodendron*
- Lysimachia foetida*
- Menispermum canadense*



May 21 - great falls of the
Potomac

rocks overlooking falls -

- c *Myosotis virginica*
- c *Rumex acetosella*
- c *Hedysarum americanum*
- c *Lonicera japonica*
- c *Campsis radicans*
- Cerastium*
- Agrostis*
- Plantago lanceolata*

Open part of park

- Leucanthemum vulgare*
- Anthoxanthum odoratum*
- Betula nigra*
- Platanus occidentalis*
- Liriodendron tulipifera*
- Trochodendron aviculare*
- Plantago rugelii*
- Stellaria media*
- Fallopia lyrate*
- Parthenocissus quinquefolia*
- Fragaria ananassa*

Wooded flats along canal

Stellaria graminea

Galium asprellum

Salvia lyrata

Nepeta hederacea

Phacelia

Phlox divaricata

Stellaria media

Alliaria

Zemorhiza longistylis

Podophyllum peltatum

Lindera benzoin

Parthenocissus quinquefolia (var.)

Veronica officinalis

Crataegus cuneifolia

Cercis

Arisaema

Celtis

Fraxinus americana

Stellaria pubera

Galium obtusifolium

Limilax hispida

Carpinus caroliniana

Cornus florida

Betula nigra

Platanus occidentalis

Rhus typhina

Symplocarpus foetidus

Menispermum canadense

May 30 - Between Pennsville
and Aberdeen, observation
from train window

On west side of the
Pennsylvania Railroad
is open cultivated
gently rolling land
are shallow depressions
without outlets, with
standing water, or if
dry with vegetation
contrasting with the
grain in the surrounding
fields. Origin of these
and of the surface
itself not obvious.

June 21 Great Falls

<i>Salvia lyrata</i>	7. p.
<i>Elephantopus nudiflorus</i>	fl.
<i>Allium vineale</i>	6
<i>Celastrus scandens</i>	7. p.
<i>Achillea millefolium</i>	fl.
<i>Lysimachia ciliata</i>	fl.
<i>Polygonia</i>	7
Lygodesmia virginica	fl.
<i>Asimina triloba</i>	7
<i>Penstemon</i>	fl.
<i>Galium obtusifolium</i>	fl.
<i>Hemerocallis fulva</i>	fl.
<i>Rosa carolina</i>	fl.
<i>Aster (Sericea)</i>	fl
<i>Viburnum prunifolium</i>	7. p.
<i>Lonicera japonica</i>	fl.
<i>Quercus stellata</i>	7 p
<i>Rhus canadensis</i>	7
<i>Galium villosum</i>	
<i>Cornus</i>	7
<i>Lepidium virginicum</i>	fl
<i>Ilex verticillata</i>	fl
<i>Viburnum dentatum</i>	7 p
<i>Sentellaria integrifolia</i>	fl
<i>Sentellaria ovata</i>	fl.
<i>Vaccinium stamineum</i>	7 p
<i>Vaccinium caeruleum</i>	7 p
<i>Lilium canadense</i>	fl
<i>Triodanis perfoliata</i>	fl
<i>Polygonia</i>	
<i>Gentian</i> sp. <i>sp.</i>	7
<i>Parthenocissus quinquefolia</i>	fl

<i>Parthenocissus quinquefolia</i> (top of cliff)	
<i>Clematis (Viorna)</i>	
<i>Vincetoxicum</i>	
<i>Stipa</i>	fl
Medicago officinalis	
<i>Thlaspi</i>	
<i>Melilotus officinalis</i>	fl
<i>Melilotus albus</i>	fl
Ptelea trifoliata	fl
<i>Celtis occidentalis</i>	7 p
<i>Dioscorea quaternata</i>	fl
(lvs. green beneath, 3 at lower node)	
<i>Staphylea trifoliata</i>	fl
Heuchera <i>Ilex decidua</i>	fl
<i>Cryptotaenia canadensis</i>	fl
<i>Alliaria</i>	fl
<i>Circaea quadrangularis</i>	fl
<i>Dodocathrenia media (int.)</i>	fl
<i>Elymus virginicus</i>	fl
<i>Hypoxis</i>	fl

June 21 - Great Falls of the Potomac
rocky flat above river

39512 *Polygala obtusata* f. ~~obtusa~~
sandy semi-open spots on
1 03 *Ilex decidua* Walt.
in wooded

June 22 - Old Civil War fort on
Union Mill Rd. about 1 mi.
south of Centreville

Flat land covered
by cut-over woods, mostly
deciduous, with scattered
Pinus virginiana and *Juniperus
virginiana*. Trees mostly
about 1 dm. or smaller dbh, but
occasional larger ones
3-4 dm.

Well preserved earthworks of
old fort extend for some distance.
Pinus strobus seedlings planted
in ~~two~~ rows along fortification,

5 ~~feet~~ ground layer
herbs and subshrubs

Vaccinium vacillans

Fraxinus, *Carya* & *Quercus*
seedlings

Glyceria hyperborea
Antium sp.

Asterolaria laevigata

Galium circaezans

Hedysarum purpureum

Lomatium integrifolium

flowers rose pink

arching shrub to 3 m. tall,
several to many stemmed,
vertically sending up new sprouts.

forest is now essentially
2 story forest -
attested large emergents
by *Quercus alba*
and *Carya* spp.
and *Liquidambar*

in canopy layer 15-20 m.

gely *Carya* spp.
and *Quercus alba*

Pinus virginiana

Diospyros virginiana

Fraxinus americana

understory 2-6 m. tall
Ilex glabra

Ilex crenata

Acers rubrum

Quercus alba

a) shrub layer ± 1 m. tall
saplings of above broad-leaf
species.
Prunus sp. (cherry)

Bypassed Fort

There is a nice quiet, picturesque tract of wooded land, approximately 100 acres, alongside Old Union Mill road, Route 659, in Fairfax County, Va. The location is about one mile and a half south of U. S. Route 29-211 and about 21 miles from Washington.

This site is one of the few remaining Civil War forts in the Washington area. Like a silent sentinel the old fortification meander along from the north southward across the wooded landscape and about 125 feet west of the Union Mill road. These fortifications are well preserved and are visible from the road.

The Old Union Mill road formerly extended to the railroad, which is about three miles south of the fortifications. This is believed to have been one of the most important fortifications guarding the Federal City and adjacent Northern Virginia territory held by the Union Army.

The property is available for purchase at parkland, at this time at less than one-sixth of the cost per acre that was approved by the Board of County Supervisors for the purchase of the 15-acre Fort Marcy tract, in another section of the county.

Observer

June 21 - Great Falls of the Potomac
rocky flat above river

39502 *Polygala obtusata* f. ~~obtusa~~
sandy semi-open spots on
03 *Ilex decidua* Walt.
in wooded

June 22 - Old C.
Union Mill Rd.
south of Centra

Flat land
by cut-over a
deciduous, in
Pinus virginiana
virginiana. Tr.
about 1 dm. or more
occasional l. 3-4 dm.

Well preserved a
old fort extend f.
Pinus strobus
in ~~foot~~ rows also

5 ~~hedge~~ gro
herbs and s.

Vaccinium
Fragaria,
seedlings

Oryzopsis hyperborea
Panicum sp.

Amaranthus laevigata

Galium circaezans

Hedysarum purpureum

Lomatium integrifolium

flowers rose pink

arching shrub to 3 m. tall.
several to many stemmed,
apparently sending up new sprouts.

The forest is now essentially
a three story forest -
1) scattered large emergents,
mostly *Quercus alba*
some *Carya* spp.
a few *Liquidambar*

2) open canopy layer 15-20 m.
tall.

Largely *Carya* spp.
some *Quercus alba*
" *Pinus virginiana*
" *Diospyros virginiana*
Fraxinus americana

3) understory 2-6 m. tall
Cornus florida
Cercis canadensis
Leycesteria
Quercus alba

4) shrub layer ± 1 m tall
saplings of above broad-leaf
species.
Prunus sp. (cherries)

June 27 - Great Falls of the Potomac
rocky flat above river

39512 *Polygala obtusata* f. ~~strobila~~
sandy semi-open spots on
03 *Ilex decidua* Walt.
in wooded

June 22 - old Civil War fort on
Union Mill Rd. about 1 mi.
south of Centreville

Flat land covered
by cut-over woods, mostly
deciduous, with scattered
Pinus virginiana and *Juniperus*
virginiana. Trees mostly
about 1 dm. or smaller dbh, but
occasional larger ones
3-4 dm.

Well preserved earthworks of
old fort extend for some distance.

Pinus strobus seedlings planted
in ~~row~~ rows along fortification,⁰³ - ~~now, no tall~~

5 ~~herb~~ ground layer

herbs and subshrubs

Vaccinium vacillans

Fragaria, *Carya* + *Quercus*
seedlings

Glyceria hyperborea

Antennaria sp.

Anemone laevigata

Gaultheria cinnamomea

Hedysarum purpureum

Lentellaria integrifolia

flowers rose pink

arching shrub to 3 m. tall.
several to many stemmed,
apparently sending up root sprouts.

The forest is now essentially
a three story forest -
scattered large emergents
mostly *Quercus alba*
some *Carya* spp.
a few *Liquidambar*

2) open canopy layer 15-20 m.
tall.

Largely *Carya* spp.
some *Quercus alba*

" *Pinus virginiana*

" *Diospyros virginiana*

" *Prunus americana*

3) understory 2-6 m. tall

Cornus florida

Cercis canadensis

Ilex rubra

Quercus alba

4) shrub layer ± 1 m. tall

saplings of above broad-leaved
species.

Prunus sp. (cherry)

Parthenocissus quinquefolia
Dianthomia spicata
Aster spp. (not in flower)
Rosa carolina
Lysimachia quadrifolia
Liriodendron tulipifera
Dioscorea quaternata
Rubus sp.
Desmodium spp.
Hypoxis aurea
Oenanthemum sp.
Solidago spp.
Carex stellata ?
Sartellaria ovata

Ditches along the fortification
 in woods with practically
 no aquatic or semi-aquatic
 plants. In one area where
 ditch approaches road
 and is open there is an
 abundant growth of
Carex
Juniperus effusus
Scirpus
Juniperus
Nuphar advena

June 22 - about 1 mile south of
 Centreville
 in rather thin second growth
Dianthomia spicata
 occasional

39509

Cunila origanoides
Anemone thalictroides
Limulus glaucus
Lysimachia japonica
Vitis spp.
Hieracium venosum
Oxalis
Antennaria plantaginifolia
Potentilla simplex ?
Hedysarum coeruleum
Carex composita ?

Beyond here, where
 ditches are in the edge
 of the woods the bottom
 of the one away from the road
 has a thin growth of
Sphagnum but with
 more of the normal
 associates bog plants
 except one tiny colony of
Ludwigia palustris. The
Sphagnum here is well
 established.

mixed woods.

39506 *Hedystis caerulea*
1 occasional to common

2 06 *Carex*
common

1 07 *Panicum*
common

1 08 *Hedystis purpurea*
common

1 09 *Sutellaria integrifolia*
rare

2 10 *Carex*
occasional

1 11 *Galium circassianum*
occasional

same in standing
water in trench of old
fort, in sunny opening.

1 12 *Lupinus*
occasional

4 13 *Carex louisianica* Bailey
abundant

4 14 *Juncus*
large colony

same - in open pine woods
along road

1 15 *Asclepias variegata*
rare

1 16 *Rosa carolinian*
common

2 17 *Sutellaria integrifolia* v. *integrifolia*
common

culms solitary, to small
tufts

small tufts, culms slender, erect,
mostly in young fruit,
occasional plants with late flowers,
flowers blue-lavender,
two white marks on palate of
lower lip.
small tuft of weak culms
culms.

culms solitary, erect;
fruit immature

culms erect, solitary
erect, heads brown

flowers white except
bright purple base of corona

flowers bright pink, fragrant

erect, flowers blue-violet
with two white marks on palate
of lower lip.

39512 *Scutellaria integrifolia* ^{var. *hastata* T. & G.}
occasional but very
local (with common blue
violet form)

June 27 - Big meadows ^{picnic} ground
Shenandoah Park

19 *Botrychium virginianum*
open grassy woodland

June 27 Elk Wallow ^{picnic} ground
Shenandoah National Park
in mixed pine and oak woods

20 *Bromus sterilis* L.
small colony several in.
across.

21 *Stellaria media*
occasional

June 28 Big Meadows ^{picnic} ground
Shenandoah National Park

22 *Dennstaedtia punctilobula*
common in shade of scrubby
forest on very rocky gentle slope

erect; flowers bright
rose pink, with two
cream white marks on
palate of lower lip.

erect part of ground
~~tops~~ faded.

spreading, semi-prostrate

pink, light green, almost erect.

July 4 - Timberlake
west of Vienna

39523 *Potamogeton diversifolius*
2 small colony in small pond.

1 24 (grass) *Festuca obtusa*
occasional in wooded bottom-land along stream

2 25 *Athyrium filix-femina*
common in wooded bottom-land along stream.

3 26 *Galium oblongifolium*
common in wooded bottom-land along stream

3 27 *Panicum*
common on slope of earth dam in full sun

2 28 *Panicum*
on disturbed ground along road in woods, shaded

4 29 *Carex*
on disturbed ground along road in woods, shaded

July 5 - Woodstock Observatory,
ridge on west boundary
of Fort Valley
quartzite ridge
covered by mixed
hardwood forest -
Tilia, *Quercus rubra*,

leaves floating.

culms almost erect,
tops nodding.

sterile fronds spreading
ascending, fertile fronds
erect.

roots deep yellow;
stems prostrate.

culms in small tufts,
erect, spikelets purple.

culms ascending.

culms in loose tufts
spreading, practically
decumbent.

Quercus prinus, *Prunus*
serotina, *Carya* sp.
Robinia pseudo-acacia,
etc. On rocks *Spiraea*
betulifolia, *Aureolaria laevigata*,
Polypodium vulgare, *Woodia*
obtusa, *Dryopteris marginalis*,
Athyrium filix-femina, etc.

July 5 - Fort Valley,
at intersection of main
road and Woodstock Rd.

Road cut in Devonian
shale - Fossil brachiopods
abundant, in thin layers.
Some ferns - Cheilanthes
and Asplenium on ledges
and in crevices.

July 5 - Elizabeth Furnace,
Fort Valley, Massanutten
Mts.

Flat valley bottom
covered by cut-over
woods, mostly small
hardwood, some
Pinus virginiana,
a little *P. rigida*. The
larger pines mostly
recently cut out.

Bottom - land along
Passage creek rather
densely wooded,
little undergrowth
except occasional
smilax.

Passage Creek here is
about 6 m. wide, with a
rocky bed with gravel
between the rocks. In
shallow places are large
colonies of *Justicia americana*,
about 3-4 dm. tall, in flower.

Clumps of *Alnus serrulata*,
7-8 m. tall hang over the
banks. Above this is
Carpinus, *Acer rubrum*,
etc. In the stream
are two of what appear
to be fresh water Rhodophyceae.
One is a coarse filamentous
greenish plant up to 5 cm.
long, with conspicuous
nodules. The other a
brownish gelatinous
thallus, broadly linear,
crisped, growing in
clumps on rocks and
pebbles, frequently small
clumps on backs of
snails.

The level of the stream
at this time is about 2 m.
below the level of the flood
plain.

July 26, Great Falls Park
Ground generally wet.
streams flowing in
small ravines

Phlox paniculata in flower.
Rabbit, ~~and~~ wood thrush,
crow seen.

July 27 - Little Stony Man Trail,
Shenandoah National Park

39530 Galium
common in thick ~~and~~ hardwood
forest on east slope.

July 28 - Dickey Ridge Picnic
Ground

on rocky outcrop in
thin woodland

39531 Galium

common

37 Fontellaria

uncommon

Plant communities in
SNP. That should be described:

Hemlock groves

Shale cuts

Greenstone cuts

Red oak forest

Chestnut oak forest

Earth banks along road

Weedy

Mysis

3700'
1000 m

procumbent

procumbent, elongate

leaves dark green; flowers
blue-violet with two
white marks on petals.

Meadows

Forest thickets

Bear oak scrub

Hardwood coves

Scarlet oak - Mt. laurel

Pine woods

July 31 - 21st, and Pitts NW.
Washington

39533 *Lolium perenne* L.
between sidewalk and curb

21st + P. N.E. corner bet.
sidewalks and curb, nearly
full sun (a), another short
section, more shady (b)

(a) (b)

<i>Setaria viridis</i>	c	
<i>Lepidium virginicum</i>	c	c
<i>Digitaria ischaemum</i>	c	c
<i>Polygonum aviculare</i>	c	o
<i>Cleavers indica</i>	c	
<i>Plantago rugelii</i>	o	o
<i>Polygonum pernyiwanum</i> (?) sterile	o	
<i>Lolium perenne</i>	o	
<i>Tridens flavus</i>	c	

Aug. 1 - Pinefields shelter
second-growth broad-leaf
forest.

39534 *Lantana serrata* And.
small dense colony in
opening in small draw

Aug. 1 - Appalachian Trail
north of Pinefield Gap
old field with small
trees

1 35 *Diodia teres*

local along trail

5 36 *Parthenocissus quinquefolia*
common climbing in
brushes and trees

Gentle slopes and rounded
low ridges, grassy with
irregularly scattered ~~box~~
young trees, mostly Robinia
but locally *Pinus rigida*,
P. strobus, *Crataegus crusgalli*
some *hassapax*. Two species
of *Rubus*, one erect (*R. arguta*?)
and one low, locally abundant,
esp. the low one! Many
herbs in grassy areas -
Chrysanthemum leucanthemum,
Linaria vulgaris, *Rudbeckia*,
hirta, *Triosteum* (bet. *perfoliatum*
and *aurantiacum*), *Asclepias*,
syrriacum, *Scrophularia*

caespitose, 3-4 stems
in a clump.

flowers lavender.

woody vine; leaves
glaucous beneath.

Aug. 2 - Paine Run Fire Rd.

Pin-oak woodland

Moderate slope facing north, with scattered *Pinus rigida* and *Quercus falcata* spaced unevenly, crowns from touching to about their own width apart, mostly 10-15 m. tall, pine trunks up to 2 dm. dbh. A few small *P. virginiana* a layer 2-3(4) m. high of *Quercus ilicifolia*, *Hamamelis*, and *Kalmia* with some *Castanea pumila*, *Nyssa sylvatica* and ^{Castanodentata} *spp.* and oak saplings, ^{Castanodentata} forming a rather continuous but not very dense scrub.

Under this a layer 0.5-1 m. tall of *Gaultheria procumbens*, *Vaccinium vaccinoides*, *Menziesia*, *Kalmia latifolia*, *Vaccinium stamineum*, *Pteridium aquilinum*, ^{lodicula} *Polystichum aculeatum*, ^{more frequently} *Nyssa sylvatica*, *Scirpus acutus*, ^{Castanodentata} *Baptisia tinctoria* (in thin spots) forming a dense scrub.

Ground layer very sparse, of *Gaultheria procumbens*, *Epigaea repens*, *Vaccinium vaccinoides*, *Chimaphila umbellata* (r), *Baptisia tinctoria* (in thin spots), *Lycopodium complanatum*, *Spiranthes*

~~stat.~~ *betulifolia*, *Iris cincta* (c)(n)

1500' Paine Run - rocky bed of stream running across transverse tilted shale beds with crevices. *Polytrichum* and a number of other mosses forming cushions and mats in crevices. Higher plants in crevices characterized by long dense root systems.

c *Panicum* at least 3-4 ft.
o *Carex* spp.

c *Achillea millefolium*

c *Aster cordifolia*

c *Eupatorium purpureum*

c *Hypericum ascyron*

a *Campanula*

Aster lateriflorus?

Viola sp.

o *Dennstaedtia punctilobula*

o *Alnus serrulata* (sprout)

~ *Platanus occidentalis* (seedling)

o *Betula lenta* (seedling)

o *Hydrangea arborescens*

~ *Nyssa sylvatica* (seedling)

o *Juncus*

~ *Menziesia pilosa* (seedling)

o *Lyonia ligustrina* (seedling)

~ *Kalmia latifolia* (seedling)

foliages sp.

Aug 5 Trayfoot Mt. Trail
up from Pine Run.

1600' Medium east slope with
broken quartzite abundant
in soil. Low forest
mostly *Quercus*
marilandica about
5 m. tall with scattered
small pines to 10 m. tall
some *Quercus ilicifolia*
Kalmii, *bassifrons*, *Amelanchier*
arborea ^{virginiana} ^{caroliniana}, making up
a very sparse ~~scrub~~ under
story 2-3 m. tall.

Debris lower story 0.3-0.6 m
tall of *Gaultheria procumbens*
and *Vaccinium vacillans*.
In open spots *Carex* sp., *Tephroseris*
virginiana, *Baptisia tinctoria*.

This is very distinctive
but rather restricted. Probably
represents an old severe fire.

Above this, at perhaps 1700'
is denser forest about 15-20 m.
tall, of *Nyssa*, *Carya* sp., *Quercus*
prinoides, *Q. coccinea*, *Chionanthus*
florida, *Diospyros*.

Scattered seedlings to 1 m. and
tall of *bassifrons*, *Cedrus dentata*
sprouts.

Moderately dense ground
layer of *Vaccinium vacillans*,

seedlings of *bassifrons*, etc.

This thick out & almost nothing
where quartzite talus is abundant.

Lower end of ridge of
Trayfoot Mt. is a quartzite
outcrop with low
sparse scrub of *Quercus*
marilandica, *Pinus virginiana*,
P. rigida, *Rhus copallina*,
Robinia pseudoacacia,
Rubus arguta, *Quercus ilicifolia*,
Q. prinoides, *Carya* sp., *Acer*
rubrum, *Amelanchier*
arborea ^(?) ^(n.), etc. *Vitis* ^(plumbea)
Pantharia spicata in openings.

On quartzite *Umbilicaria*
is abundant, *Polypodium vulgare*,
Tephroseris, *Carex* sp., *Spiraea*
betulifolia, *Vaccinium*
vacillans, *Potentilla* complex?
in openings, also *Paronychia*
wilsoniana rare, *Phlox* rara
rare, *Heuchera*.

Above this low mixed
forest, oaks, pine, *bassifrons*,
etc. In this on ridge several
very small openings where
all trees have died, dead
sticks still standing or
bent over. No apparent
reason. Possibly all were
bassifrons, or *Quercus montana*,
and were killed by a disease.

Aug. 2 - Skyline Drive, head of

Duldo Hollow, just s. w. of Brown's Gap

39537 *Salix caroliniana* Michx.
on talus below road

Aug. 2 - Skyline Drive, Doyle River
Overlooks,

roadside, in hardwood forest

4 38 *Carya glabra* (Mill.) Sweet
common

3 39 *Quercus velutina*
common

3 40 *Polygonum convolvulus* L.
abundant on

1 41 *Hedysarum purpurea* v. *longifolium*
occasional on

3 42 *Tragopogon pratensis* L.
occasional on

3 43 *Mentha spicata* L.
abundant on

Aug. 2 - Pine Run, Augusta Co.
in seepy place along road in
hardwood forest

1 44 *Eleocharis*
rare

4 45 *Scirpus polyphyllus*?
common

1 46 *Scirpus cyperinus* (L.) Kunth.
rare

#7 same - ^{in crevices in open}
rock bed of stream

1 47 *Panicum*
occasional

7500'

2850'

870 m

shrub 1.5 m. tall.

tree about 10 m. tall.

fruit immature

low spreading tree, 2 m. tall

ascending, old leaves reddish

corolla bright lavender

flowers yellow.

aromatic herb; flowers
pale lavender.

~~not~~ partial peduncles
curving upward.
excl. heads pendent

128

1958 Virginia

29548 Carex
rare

2 47 Panicum
common

3 50 Panicum
rare

1 51 (grass) *Agrostis perennans*
rare

1 52 Panicum
occasional

3 53 Carex
occasional

1 54 Panicum
occasional

2 55 *Juncus* *Tenuis* f. *Monspeliensis*
common

1 56 *Aster divaricatus*
common

1 57 *Campanula divaricata*
rare

1 58 *Hypericum ascyron* L.

Aug. 2 Trailfoot Mt. Trail,
Left Hand Hollow, Augusta.
in mixed pine and hardwood
forest

3 59 *Galium pilosum* var.
occasional in thin places

2 60 *Hedysarum occidentale*
var. *ternifolium*
common

2 61 *Galium circassianum*
common

1 62 *fibrosa* (?) *Polygonum aviculare*
occasional

Shenandoah Nat Park 29

densely caespitose,
culms prostrate &
ascending, 1 m. long.

densely caespitose, culms
ascending, spikes pendent.

bracts pale lavender to white,
ditch yellow.

pale flowers pale
blue - lavender.

stems ascending

39563 *Panicum*
1 occasional
4 64 *Chenopodium umbellatum* local on flat ground near stream
1 65 *Monotropa uniflora* L.
rare, on flat ground along stream
2 66 *Ascyrum hypericoides* L. ^{occasional} ~~var. m~~ prostrate
occasional on steep slope
apparently burned very at
some time.
1 67 *Leschea minor* L.
very local on steep, burned
slope.

Aug. 2 - southwest ridge
of Grayfoot Mt.

quartzite ridge
3 68 *Asclepias verticillata*
occasional in open
scrubby woods.
2 69 *Clitoria mariana* L.
occasional in woods
4 70 *Aralia hispida*
local on ledges of quartzite
outcrop, in open.

21 same, rock ledges on
west side

3 71 *Carex*
shaded
3 72 *Quercus rubra*
common
73 *Ribes rotundifolia* Michx.
rare on

1500' leaves glossy.



prostrate; flowers
yellow, petals 4, tendency
to be in pairs.

flowers white.

of stems ascending; leaves
dark green, flowers lavender
purple.
erect, suffrutescent herb
up to 0.8 m. tall, ripe fruit
bluish black.

caespitose, spike, drooping.

39575 *Panicum boxii* Poir
local on ridge in woods
3 7b *Scutellaria*
rare on great rocks

Aug 3 - South River Picnic ground
on roadsides

2 77 *Setaria viridis* var. *werneri* (R+S) Beau
common
1 78 *Setaria viridis* (L.) Beau
occasional
2 79 *Setaria geniculata* (Lam.) Beau
occasional
1 80 *Galinsoga ciliata* (Lef.) Blake
abundant

Aug. 7 - Pinefields gaps

81 *Galium*
local in old-field thickets

cespitoso
flowers white.

spikes green

spikes greenish

spikes yellowish

rays white

forming dense tangle,
stems 1 m. or more long,
flowers cream-white,
4-parted.

Aug. 5 - Washington
New Hampshire Ave. between
N and S N.W.

Former lawn between
sidewalk and curb - 3
sections on 50', one 6', other 50' ±
rather well shaded. 50' 6' 50'

<i>Taraxacum officinale</i>	c - 0	~	
<i>Trifolium repens</i>	a -	c	
<i>Plantago rugelii</i>	c - c	0	
<i>Plantago lanceolata</i>	0 - 0	c	
<i>Poa annua</i>	c -	a	
<i>Polygonum persicaria</i>	0		
<i>Polygonum aviculare</i>	0+	0	
<i>Eleusine indica</i>		0?	
<i>Setaria viridis</i>	0	c 0	
<i>Muhlenbergia schreberi</i>	0	c	
<i>Bidens bipinnata</i>	~		
<i>Lepidium virginicum</i>	~	~	
<i>Digitaria sanguinalis</i>	c	a	
<i>Ailanthus altissima</i>		indist	

Aug. 5 Washington

N St. N.W. lot. New Hampshire Ave
and 21st St. thin shade
in 3x6' spaces around trees
next to curb. n. side of st.
from e. to w.

<i>Chenopodium ambrosioides</i>			~
<i>Setaria viridis</i>	a	a	
<i>Polygonum aviculare</i>	c	c	0 0
<i>Plantago lanceolata</i>	~		
<i>Ulmus sp.</i>	~		
<i>Euphorbia supina</i>	0		c
<i>Lepidium virginicum</i>	c	0 0	0
<i>Trifolium repens</i>	a		c
<i>Digitaria sanguinalis</i>	0	c a c	
<i>Trifolium repens</i>	~	0 0 0	
<i>Plantago rugelii</i>	c	~ c c c	
<i>Muhlenbergia schreberi</i>	c	0 0	
<i>Panicum dichotomiflorum</i>	c	~	0
<i>Chenopodium album</i>	~		
<i>Tridens flavus</i>	0	c	
<i>Viola sp.</i>	~		
<i>Eleusine indica</i>	0 0		
<i>Poa annua</i>	0		
<i>Oxalis corniculata</i>	~		

Aug. 6 - Great Falls

Plots between old way and the foot of slope up to entrance road, beyond the horse trail running up to the entrance road and beyond the easternmost picnic ground road are mostly swamp.

The swamp has

- Arisaema triphyllum*
- Lamium galeobdolon*
- Impatiens capensis*
- Dioscorea* ~~potentilla~~ *villosa*
- Lindernia parviflora*
- Illex verticillata*
- Rhus toxicodendron*
- Acer rubrum*
- Dymphlocarpus foliosus*
- Viburnum dentatum*
- Rubus sp.*
- Nyssa sylvatica*
- Cuscuta sp.*
- Eupatorium fistulosum*
- Smilax rotundifolia*
- Osmunda regalis*
- Osmunda claytoniana* ? sp.
- Polygonum aviculare*
- Calla*
- Quercus*
- Cryptotaenia canadensis*
- Liriodendron tulipifera*
- Thlaspium*

Viburnum ~~muifolium~~
Mitchella ~~repens~~
Parthenocissus quinquefolia
athyrium sp.
Dryopteris cristata
Lonicera japonica
 several grasses and sedges.
~~Dioscorea~~
Polypodium ~~acrostichoides~~
 & ~~Lycopodium~~ *Pycnophyllum obscurum*
 in hummocks.

This swamp lies between the cliff below the road and a ridge of schist along which skirts the old road. At the south end of the swamp is another ridge these ridges covered by oaks - hickory forest.

Aug. 9 - Franklin Cliffs

39582 *Polygonum* ~~rostratum~~ ^{tanu}
on rock ledges

Aug. 9 Skyland

around resort

1 83 (var.) *Hesperis matronalis* L.
one small colony near trail
in shade1 84 *Picea engelmannii* purpurea
planted near cottage2 85 *Fagus sylvatica* var. *atropurpurea*
planted near cottageAug. 9 slopes of Stony Man
Mountain along Appalachians
Trail ~~near~~ north of Skylandin mixed hemlock and
hardwood forest on steep ^{wet} slope2 86 *Betula alleghaniensis* ~~var. spicata~~
common2 87 *Ribes rotundifolia* ?
on rock cliff

88

Aug. 9 - Little Stony Man Cliffs,
along Appalachian Trail1 88 *Spiraea latifolia* var. *septentrionalis*?
common on tops of cliffsAug. 9 - Stony Man Mountain
on wooded summit1 89 *Ilex montana*
in undergrowth

decumbent at base

stems 1 m. tall, mostly
in fruit, flowers purple.

Tree 10 m. tall, blue-gray.

Tree 15 m. tall, slightly
coppery ~~but~~ green.small tree, bark yellowish
gray, wintergreen odor.
pendent shrub 1.3 m. long.low shrub 2-3 dm. tall,
flowers white, pinkish
in centers.slender shrub 2 m. tall,
fruit immature

39590 *Phlox montana*
on edge of cliff,
1 91 *Liatris scariosa?*
rare

Aug. 9 - Stony Man Mountain
on open rock ledges near
summit, north west side

2 92 *Juniperus*
in crevices

1 93 *Lycopodium selago*
rare in crevices

1 94 *Taxus canadensis*
colony several m. in diameter
just back of top of cliff

1 95 *Polygonum scandens*
rare on ledges ^{June}

1 96 (fern)
common in crevices

2 97 *Carex*
occasional on ledges

1 98 *Liatris scariosa*
common at tops of cliffs

The rocky ledges and
cliff tops have a character-
istic community of *Phlox*
subulata, *hastifraga mitchamii*,
Potentilla tridentata, *Penstemon*
punctilobula, *Lolium*
canescens var *monticola*,
Liatris graminifolia,
Calochortus hypoleucus,
Deschampsia caerulea

dense shrub 2.5 m. tall,
fruit immature.
stem single, erect, flowers
bright purple.

low, somewhat ascending,
fruit immature, reflexed.
almost erect.

caespitose

caespitose, flowers bright
purple.

Juniperus sp. *Carex* sp.
and rarely, *Lycopodium selago*.
growing in crevices and ledges.
In most localities only
part of these are present.

Aug. 9 - Rapidan Fire Road
east of Big Meadows
shady cut bank, 45° slope
Discrete clumps of
Campanula divaricata
up to 1 m. apart.
scattered *Lysimachia*
quadripolia, scattered
Rubus argutus, a few
tufts of *Lonicera* sp.,
Dianthus spicata, *Hedysarum*
purpurea var. *longifolia*, a few
~~small~~ *Ribes* bushes, a few
scattered seedlings of
various things.

Above this a gently
sloping completely stony
surface, with scattered
clumps of chestnut and
Pectis lenta sprouts -
Abundant *Dennstaedtia*,
Hymenostyia quadripolia,
Dianthus and *Campanula*
divaricata, also *Aralia*
prudens, some *Aquilegia*,
Parthenocissus, ~~cosmopolitan~~
Fernilacina mucronata,
Viola primulifolia,
Vaccinium vitis-idaea, *Apothysa*
androsaemifolia, *Aster*
of. not yet in flower, *Ribes*,
Solidago, *Lactuca*, a
few oak seedlings & small

sprouts under 1 m. tall.
Smilax hispida, *Oroxylum*
Achillea zigzag *aptera*,
Amianthium ~~ss~~, *Spicastrum*
Corylus americana, *Hedysarum*
Chestnut sprouts fruiting
abundantly

Aug. 9 - Upper Rappahannock
Road, just east of Big Meadow

39599 *Betula lenta*
in open meadows

39600 *Agrimonia gryposepala* Willd.
in open woodland

4 01 *Bromus*
abundant around old dump

3 02 *Salix lucilis* Marsh.
occasional in open woodland

3 03 (few) *Pennstaedtia punctilobula*
abundant in edge of
forest or flat ground

2 04 *Ribes*
occasional on very rocky
open ground

3 05 *Pennstaedtia punctilobula*
abundant on very
rocky ground in open.

Aug. 10 - Canyon of South River
north side, along Fire Road.
in road, shaded.

1 06 *Polygonum punctatum*

1 07 *Polygonum dubium*

1 08 *Gallium triflorum* var. *aspelliforme*

Aug. 10 - head of South River Falls
South River

2 09 *Betula alleghaniensis* Britt.
bottom of wooded canyon

bushy tree 8 m. tall
flowers yellow.

~~spike~~ *spike* panicle
drooping, culms erect,
shrub, many stemmed
from base, to 2.5 m. tall,
shoots 1.5 m., leaves
glaucous beneath,
nodes erect from
shallowly buried rhizome,
small bushes, fruit in winter

nodes erect from rhizome
deeply buried between
rocks.

flowers greenish, spike nodding
flowers pinkish white.
prostrate; flowers pale green.

tree 15 m. tall, wintergreen
odor when broken, bark
yellowish gray.

Aug. 10 - flats north of South River, in detached area of Shenandoah Park on left fork of South River fine N.

Old field: groups up to broken thickets of Robinia, Bassasfras, Pinus virginiana, Cornus florida, Pyrus coronaria, with some Rhododendron, R. glabratum, Pinus strobus, P. rigida, Rhododendron, Pyrus malus, uneven height but mostly 5-10 m. Vitis, Parthenocissus, etc. common.

Openings with *T. virginiana* and *Rubus flagellaria* dominant, *Aster ericoides*, *Lobelia spp.*, *Chrysanthemum leucanthemum*, *Prunella*, *Adonis*, *Daucus carota*, *Cusum lanceolatum*, etc. common.

Aug. 10 - South River cemetery open ground in old weedy cemetery

39610 *Vinca minor*
 1 abundant
 1 11 *Spiraea prunifolia*
 common
 2 12 *Miscanthus sinensis*
 common
 1 13 *Dianthus barbatus*
 common
 2 14 *Pinus rigida*
 in open old field with scattered trees

prostrate; sterile.

slender shrub 1-1.5 m. tall,
 sterile.

large clumps up to 2 m. tall,
 with last year's panicles.
 sterile

Tree 8 m. tall.

Aug. 10 - 1 mile north of
South River overlook, on
Skyline Drive

Around old farm site

29415 *Pyringa vulgaris* -
> 16 *Buxus sempervirens* L.
> 17 *Abies balsamea*

> 18 *Rosa canina* L.?

> 19 *Rosa canina* L.?

> 20 *Pyrus coronaria*
common in hedges and
old fields

> 21 (grass) *Arhenatherum elatius*
roadsides

980 m.

small tree 3 m. tall, very
brushy; fruit immature.
shrub very dense shrub.
brushy small tree 4 m. tall,
tips of twigs bent down -
diseased? mutant form?

scrambling bush,
leaves dark green, sub-glossy
above, flowers rose-pink
scrambling bush; leaves
hull above. sterile, very
densely branched. low
tree, 1 m. tall, fruits
immature.

culms erect, panicles
nodding.

Aug. 21 - Clifton - Triassic shales and consequent purplish red soils begin here. Curious erosion remnants or basalt intrusions on boundary Clifton - Little Falls and well into Little Falls, forming a complex dissected wooded ridge, quarry and many houses on it. Deciduous forest.

Pellington - pale gray-brown soil. Gallery forest along Pompton River, very tall, pines, oaks, etc. Flat country w. of river with pale brown alluvial soil with large boulders. Mostly farmed but some small second-growth wood-lots. Largely Acer rubrum, Betula populifolia, some oaks. Extends past Rockaway River. Mostly small farms scattered trees and small bits of woods. Scattered large oaks. Highground is wet sedge several nice patches of woods.

Two egrets in pond east of Denville.

Mountain Lakes Borough much mixed woods on low rolling hills.

East of Dover near Rockaway River low hills are of either

glacial material or outwash alluvium. South of Dover in distance are wooded hills or low mountains.

East of Dover some hummocks of gneiss, etc. sticking up through alluvial material.

Between Dover and Netcong are hills of a hard rock, some parts look like granite, parts darker and denser, cut by dikes. Wooded.

All woods in this part of state are deciduous.

Budd Lake, lined with resorts and swimming beaches. 100+ alt.

West mixed woods on slope. Then a plateau of stony alluvium. Then a series of ridges and valleys running n.e.-s.w. the ridges wooded.

Musconetcong River Valley flat and in farms, bounded by long rounded ridges. Ridges wooded with many cleared fields and pastures, some abandoned, fertile flat wet bottom-lands along streams farmed more intensively.

Valley of Pequest River

broad flat, in farms.
Ridges on both sides mostly
wooded, especially Mt.
Mohicans on n. w. side.

This area is a miniature
"valley and ridge province".
Rocks varied but not well
exposed along highway.

Woods all deciduous, not
a conifer seen anywhere
except cultivated spruces at
Buttzville. A few *Juniperus*
virginiana also, wild, at Buttzv.

Near Manunka Church
bluffs of phyllitic shale.
A conifer here that did not
look quite like *Tsuga* - more
like *Larix*, but probably not.
Did not get a good look at it.
More just south of Delaware
on bluffs. Possibly *Picea abies*
or *P. glauca*. Otherwise all
deciduous.

Delaware Water Gap -
on south sided steep wooded
slopes interspersed with
bare rock cliffs and scree
slopes. Much more cliffs
and talus on north side.
Great scree slope invaded
by *Betula*, *Juniperus*, etc.

On bluffs forest is mostly
broadleaf, but some conifers (e.g.
Picea? *Juniperus?* *Abies?* ??) are and

Probable
group

Pines.

On Pennsylvania side
after passing Gap the
conifers form a noticeable
component of the forest -
much *Betula*, some *Tulip*,
Platanus, *Juglans*, *Ulmus*,
Quercus.

Up on Pocono terrace beyond
Stroudsburg, to beyond
Tannersville, a mosaic
of woods, fields, etc. The
woods principally deciduous
but with a considerable
coniferous component.

Conifers - *Tsuga*, *Pinus*. These
more abundant westward.

This country, along the
highway, has a very
mosaic appearance.
Fine patch of medium
growth *Tsuga* on left of
turn-off to Pocono at
Swiftwater. Road to
Pocono through much
wilder country, still
some cottages, etc.

Red pine, paper birch, white
pine, black birch, elm,
sugar maple, hickory,
chestnut oak, red maple,
sassafras, red oak, chestnut
sprouts.

Most of this is very y

young second growth, 5-8 m. tall with scattered larger trees. Some much younger, very bushy. Some *Pinus rigida*, with birches and maple, and oaks. *G. ilicifolia*, *Viburnum cassinoides*, *Populus tremuloides*, typical fire country.

Conifers - *Pinus strobus*, *P. resinosa*, *P. rigida*, *Picea rubens*, *Tsuga*, plus introduced *Picea engelmannii*, *P. abies*, *Pinus sylvestris*, *Larix laricina* (?) very noticeable around Pocono Pines, but not dominant. Birches, *Acer*, *Populus*, etc. abundant. Beautiful patch of *Tsuga* wood west of Pocono Lake. West of this much planting of miscellaneous conifers in old fields, more beautiful old hemlock and hardwood forest.

Halfway bet. Pocono Lake and Blakeslee a farming area begins. Then more bushy woods, conifers and *Populus tremuloides*. Then much planting of blue spruce for Christmas trees?

The country east of here was

evidently, what 20 years ago was largely an open burned over country dominated by *Spirea latifolia*. West of Blakeslee, also.

is scrubby second growth.

Rhododendron maximum common in woods east of E. side. All of the woods here are second-growth slender, 10-15 m. tall, or locally, to 20 m. mostly *Betula* and *Acer rubrum*, very few conifers. Red Triassic shale makes up the east side of the Lehigh Valley at White Haven. West side also.

Between White Haven and Freeland a broad valley with orchards, ridges on sides wooded. Coal cuts in shale covered by *Comptonia peregrina*, invaded by *Betula* spp.

Toward Freeland very scrubby mixed deciduous second growth. Much scrub, principally *Quercus ilicifolia*, with scattered trees.

Beyond Freeland are many open pit coal mines and enormous bare culm piles.

39622

Aug. 21, between Freeland
and ~~Hazee~~ Beaver, Luzerne Co.
Echinocloa
desiccating roadside pool
in coal mine area

southwest of Hazleton
are vast areas of open
gits and culm piles.
Betula is making some
headway invading the
culm piles. Farther on
much older mines,
somewhat wooded, mostly
with small birches.
Beyond Shepperton in valley
of Catawissa Creek more
purple Triassic shale.

Aug. 22 - Bottomlands along
west branch of Susquehanna
River above Northumberland -
mostly farmed but some
small patches of dense
woods, largely Robinia and
Acacia saccharinum.

Valley of Buffalo Creek, west of
Mifflinburg - broad rolling
flat bottom, almost all farmed,
with hedgerows of trees.
Long ridges on both sides
completely wooded except for
conspicuous bare spots of talus on
north side. Deciduous woods

w.e. of Hazleton

culms spreading to
ascending, spikelets
deep maroon or green.

with considerable conifer
admixture and patches
near the top on south side.
Sharp break in character
of forest about 1/3 the way
up on north side, probably
corresponding to a change in
slope. The lower third much
finer textured, possibly second growth.

Pennsylvania State Forest
on high ground between this
valley and the one where
Woodward is located. Dense
hardwood forest, nice
picnic ground. Valley to west
very similar to that of
Buffalo Cr., more hilly.

East of State Coll. are
several ridges of bedded
bluish-gray limestone.

From northwest of State College
on top of wooded ridge, looking
northwest or north across
Eagle Creek is a great expanse
of woods, mostly deciduous,
some admixture of conifers.
Valley bottoms with clearings.
(Photos 21-22). From Shryock.

forth. slope of Eagle Creek Valley covered by a dense second-growth forest, about 10 m. high. trees up to 15 cm. diam. mostly much less.

Quercus rubra

Quercus alba

Betula lenta

Acer rubrum

Quercus prinus

Fraxinus americana

Liriodendron tulipifera

occasional small *Tsuga* + *Pinus strobus*

This under-story of
Cornus florida, *Acer pensylvanicum*, smaller *Kalmia latifolia*, ~~small~~ *Betula*, etc.

The cut bank of the highway grassy but abundantly invaded by *Robinia pseudoacacia*. The source of seeds not at all evident.

Similar woods almost continuous, except for one fair sized open area, almost to Phillipsburg. Being logged in a few spots.

Moshannon State Forest bet. Clearfield and Rockton is

dominantly a mixture of oaks, with occasional other trees, when it has not been cut or burned recently.

Cook Forest State Park - magnificent hemlock and white pine (several photos). 4 acres of cathedral area thrown by wind - mostly cleared out by Pa. Dept. of Waters to protect the public from fires. A few trees left to show public what storms do.

Aug. 23 - Lowlands of Muskingum River bet. Coshocton and Dresden along highway (57)

Large areas of marsh land, some swampy woods and sloughs, cultivated fields, hay and maize, on higher areas.

Near Triway in a wooded slough 6 wood ducks. Many aggressive mosquitos.

Woods along sloughs of large elms, *Juglans*, *Platanus*, *Populus deltoides*, *Quercus prinus* (a very broad leaf f. *bicolor*), *Acer negundo*,

and *Prunus serotina*, *Gleditsia triacanthos*, *Acer saccharum* in under-story *Aesculus* *stellata*, *Fraxinus americana*, *imbricaria*, etc.

Campanula americana, very common in edges of wood, much darker blue than in Virginia.

Tall blue and yellow *Lactuca* abundant. *Licopus*, *Vitis*, and a very large *Polygonum* sect. *Piniaria* climbing in edges. *Impatiens capensis* and *I. pallida* both flowering

Aug. 24 - ^{one mile} south of Bremen - open bottom-land forest, principally *Juglans nigra*, with conspicuous ground layer 1 m. tall of a sunflower. Fields nearby with conspicuous stands of *Vernonia*.

1/2 w. of Hartville outcrop of bedded limestone on edge of broad shallow stream ravine. Farther along where rock does not outcrop is a beautiful juniper woodland on rolling hills which form the edge of the ravine.

Aug. 26 - southeast of Bloomington, Monroe Co.

Deeply incised drainage system of Salt Creek about 250' relief. canyon walls densely wooded. The woods badly cut over and composed mostly of small sized trees, entirely deciduous oak-hickory, with some tulip, much *Larix*, etc. flat ridge-tops and bottom cultivated or pastured. Soil rather sterile, first crops after clearing very good soon falling off, this especially on ridges. Bottom lands still rather intensively farmed, ridge not so much so. Much sumac brush, *Larix*, etc. on abandoned fields.

Nearer to Bloomington is a rolling outwash plain, more intensively farmed but very worn-out. much land abandoned. Wahl farm being largely turned into pasture - very sterile soil being heavily fertilized, planted to grass, clover and *Desmodium* *stratiotes*. This being grazed lightly areas in forest and game preserve.

Aug. 27 - Pine Hills

Gorges cut several hundred feet into a flat plateau of horizontal sedimentary beds.

On the flat upland most of the vegetation is old field thicket with introduced pines.

Where there is good forest it is mostly white oak with some ~~acer~~ *nigrum* var. and some *Carya*, some other oaks (q. *velutina*?).

On knife-edge ridges *Melilotus alba*, *Popostegia virginiana*, dwarf form of *Monarda fistulosa*, etc.

Generally speaking the plateau is covered by oak-buckeye forest with emphasis on oaks and considerable tulip. The slopes and bottoms are covered by beech-maple with abundant hemlock and some white pines, much *Ostrya*, *Carpinus*, etc.

On ~~steep~~ slopes the vegetation is mixed - often on gentler ones *Tsuga* is very common, mixed with beech. *Epifagus* common but no *Maianthemum*. Occasional tulip, red oak, sugar maple. *Mitchella* common.

Steep slopes have hemlock, *Taxus*, *Fagus*, *Ostrya*. Cliffs in places bare.

Dusty ledge under overhanging bed of sandstone has large colony of ant lions. Large dead insect common, fairly large larvae caught and struggling or almost dead.

Bottom-land with *Ostrya*, *Carpinus*, *Fagus*, *Populus deltoides*, *Siriodendron*, *Asimina*, *Platanus*, *Cercis*, *Acer nigrum*, *Corus florida*,

finished Kodachrome roll, on entire area roll, stated another, various views.

Aug. 29 - Pine Hills.

39623 *Echinochloa*
 " in road in old field in full sun
 24 *Echinochloa*
 in road in shade around mulches
 25 *Hedysotis purpurea* var. *calycosa*
 on limestone - edge ridge on
 sandstone, almost full sun

Aug. 29 - Wabash Natural Area,
 Sugar Creek, northwest of
 Aztecopolis, St. Parke Co.

Partly old second-growth
 forest small part old
 fields with ~~small~~
 scattered small sapling
 regrowth.

The second growth nature
 is indicated by large
Sassafras albidum in
 abundance, even though
 some oaks and beeches
 are up to 1 m. dbh. The
 forest is mixed *Quercus*
alba, *rubra*?, *palustris*?
acuminata var. *lignum*, *Fagus*
grandifolia, etc. *Ulmus* sp.

Some of the red oaks are
 succumbing to oak wilt.

In parts there is an
 abundant layer of
Ulmus saplings up to about
 1 m. tall, though few seem
 to attain more than that size

FIELD TRIP TO PINE HILLS AND THE WABASH NATURAL AREA, SPONSORED
BY THE ECOLOGICAL SOCIETY OF AMERICA, THE NATURE CONSERVANCY,
AND THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS, ON FRIDAY,
AUGUST 29, 1958

Description of Pine Hills

Smith (1933) has described the geology and geomorphology of Pine Hills, and presents a topographic map of the area. Pine Hills lies within the glacial boundary in west central Indiana, occurring in the Till Plains Section of the Central Lowland Province. The physiographically most striking features of the region are the deeply entrenched meanders with nearly vertical walls of two tributaries of Sugar Creek. In referring to the sharp ridges, or "backbones", thus produced, Smith says, "Without exaggeration, they may be considered as the most remarkable examples of incised meanders in the eastern United States. In fact, although they are exceeded in magnitude by such features in the Rockies, none exceeds them in perfection and in interest." The cause of meanders in such youthful topography Smith attributes to the peculiar effects of weathering and erosion in the Borden formation, this being especially susceptible to undercutting. All the bedrock exposed at Pine Hills is referred to this formation, and is composed mostly of shaly sandstones, only a small portion of which is fossiliferous. Owing to erosion glacial drift is thin to absent in the vicinity of the gorge.

With regard to the vegetation, Friesner and Potzger (1934) have written: "Botanically this region exhibits a larger number of excellent and clear-cut forest ecological areas and associations than any other region in Indiana known to the writers. For example: There are wooded old flood-plain terraces along the meandering streams, where they have cut wider valleys; second terraces or still older flood plains now occupied by dense stands of deciduous forest trees; upland plateaus into which the canyons have been cut; *Pinus*-*Tsuga* slopes; transition areas between the preceding two; *Tsuga*-covered canyon walls; *Pinus*-*Tsuga* groves, and *Taxus* associations on north-facing canyon walls where the angle approximates 45 degrees." A vegetation map and quantitative data are presented in this publication. The authors conclude that *Acer saccharum* is the "climatic climax" of this region, *Fagus* being greatly reduced compared to the area of Indiana to the east. *Tsuga canadensis*, here at the western margin of its range in the central states, and *Pinus strobus* are considered as relicts of a changing postglacial climate by those authors. Both these species occupy drier sites than the adjacent *Acer*-*Fagus* forest, as suggested by soil moisture and evaporation studies in certain other *Tsuga*-*Pinus* sites in Indiana. Soil pH studies indicate a decidedly more acid condition under the *Tsuga* stands than in adjacent deciduous forest (Potzger and Friesner 1936). The area has doubtless been selectively lumbered in the past, and in fact, one of the backbones ("Mill-Cut Backbone") was excavated at one point in the 1850's to operate a small woolen mill for a few years from the flow of water through the cut. The owners of the land have planted several species of pines on abandoned fields on the upland approaching the gorge.

Literature Cited

Friesner, R. C., and J. E. Potzger. 1934. Climax conditions and ecological status of *Pinus strobus*, *Taxus canadensis*, and *Tsuga canadensis* in the Pine Hills region of Indiana. *Butler Univ. Botanical Studies* 3:65-83.

Potzger, J. E., and R. C. Friesner. 1937. Soil acidity and hemlock reproduction in relic colonies in Indiana. *Proc. Indiana Acad. Science* 46:93-99.

Smith, E. R. 1933. The physiographic features of Pine Hills Nature Study Park, Montgomery County, Indiana. *Proc. Indiana Acad. Science* 42:153-161.

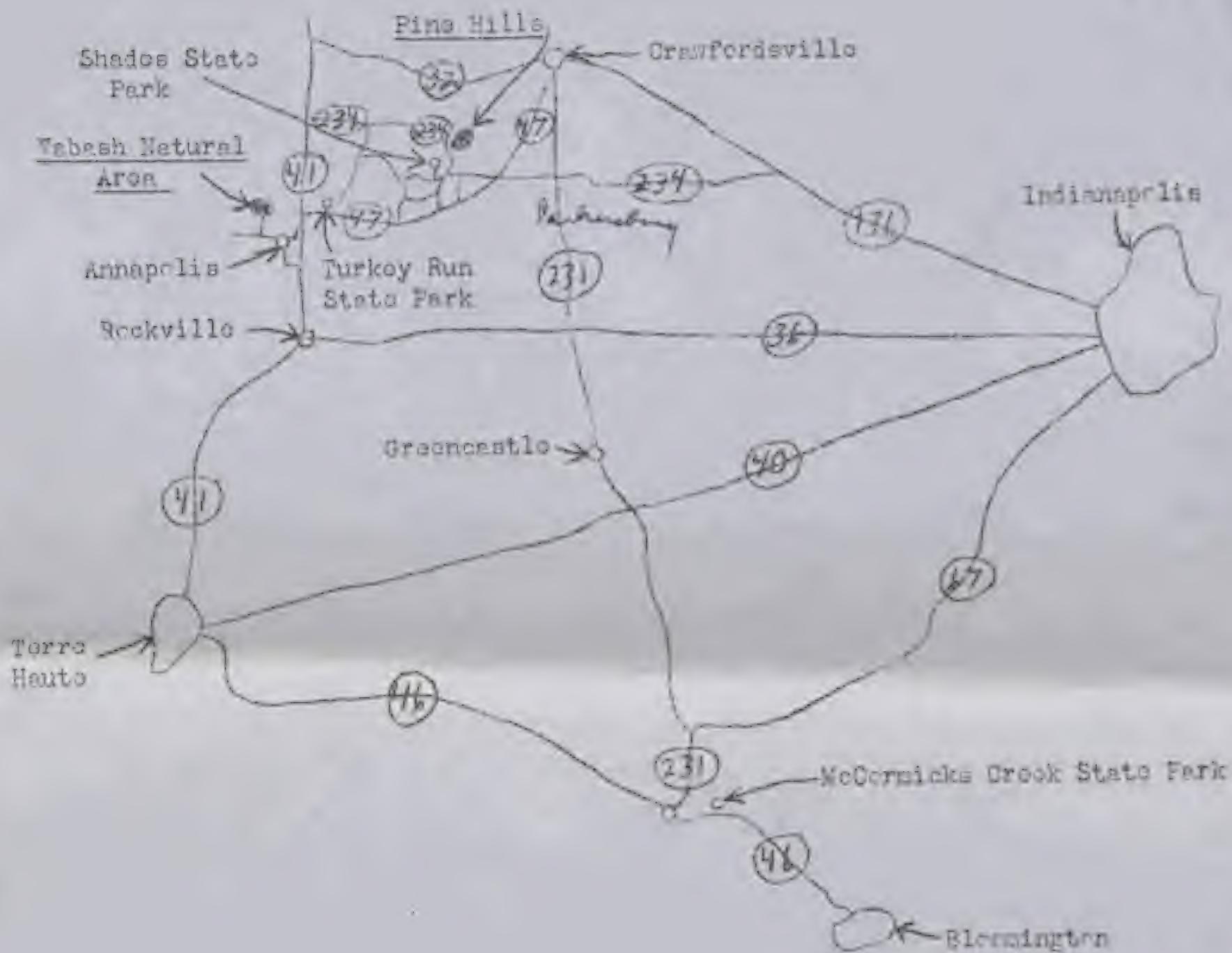
The Wabash Natural Area

Wabash College has recently been given jurisdiction over the late V. C. Alice farmstead, a 160 acre tract of mostly wooded land of rough topography bordering Sugar Creek. Dr. Alice had intended to retire to this area and continue his ecological research, but this wish was never fulfilled. A long-term ecological research program, however, has now been initiated on the property by the staff of Wabash College, under the direction of Dr. Richard Laubengayer. The project is financed by the Atomic Energy Commission, and involves taking as complete an inventory of the biota as possible, together with a detailed analysis of the environment, to serve as a basis for evaluating the effect of fallout on natural and seminatural ecosystems in this region. Several thousand dollars worth of instrumental equipment for microclimatological and soil measurements has been installed, and a laboratory building is being constructed on the premises. In addition to vegetational, microclimate, and soil analyses, such varied projects as rates of decay of wood, the limnology of Sugar Creek, migration of box turtles, old field succession, and the morphology and life history of Epifagus are also being investigated. The area and facilities are available to college classes and research workers from neighboring institutions as well as those from Wabash College itself.

IT IS REQUESTED THAT VISITORS NOT COLLECT IN PINE HILLS
OR THE WABASH NATURAL AREA

Field trip leaders: John Folton, Butler University, and Richard Laubengayer, Wabash College.

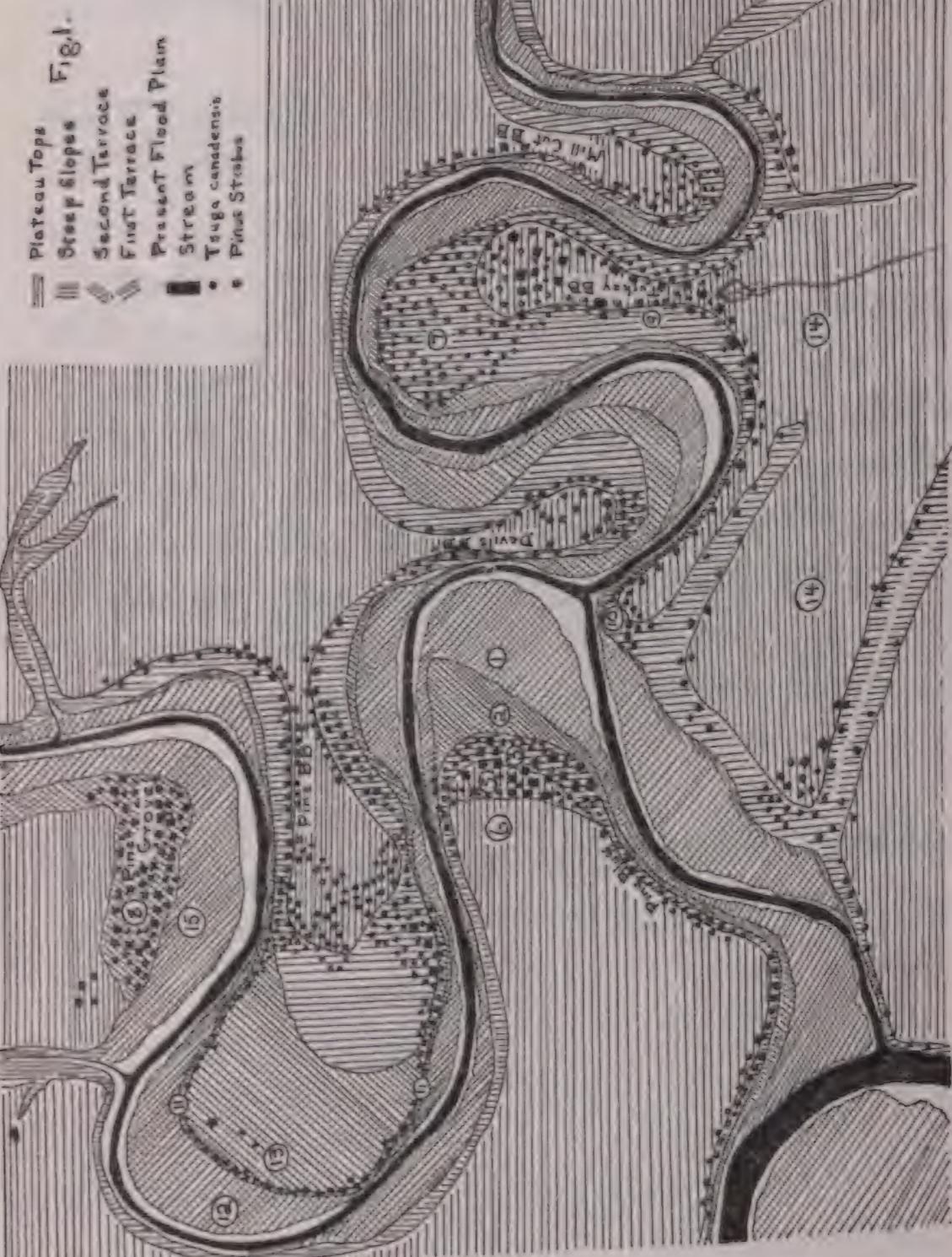
DIRECTIONS FOR REACHING PINE HILLS AND THE WABASH NATURAL AREA



To reach Pine Hills from Bloomington: Take Highway 46 to Sponcor; then Highway 231 north to its junction with Highway 234. Turn west on 234 until a sharp turn north occurs in the road one mile east of Shades State Park. Continue north (on 234) for about one mile. A white house and red barn is situated on the west of the road, and cars may be parked here along the roadside. A jeep road extends to the east about $\frac{1}{2}$ mile to the gorge.

To reach the Wabash Natural Area from Pine Hills: Drive south to Highway 47, and then west to Highway 41. Turn south on 41 for about 1.4 miles, at which point turn west (at a Citico Service Station) on the road which will lead to the small town of Annapolis. Continue west on the gravel road leading out of town about 1.5 miles until the second road to the north is reached. Take this road to the Allee farm (0.4 miles). The road to the northwest of there leads to the instrumental stations and woods. Cars should be parked in the field about 0.3 miles from the Allee farm stand.

N



culms spreading to erect,

culms erect, 3-10 m. tall.

small clumps, flowers white.

and Ulmus is not abundant in canopy layer. Instruments that the Wabash College people have in old field and in woods indicate that the relative humidity and soil moisture are lower in the woods than in the old field.

A few photos in beech-maple oak forest.

Aug. 29 - Pine Hills.

39623 *Echinochloa*
 2 in road in old field in full sun
 2 24 *Echinochloa*
 in road in shade around sulphur
 1 25 *Hedysarum purpureum* var. *calycosum*
 on knif-edge ridge on
 sandstone, almost full sun

Aug. 29 - Wabash Natural Area,
 Sugar Creek, northwest of
 Corydon, ~~in~~ Parke Co.

Partly old second-growth
 forest small part old
 field with ~~small~~
 scattered small sapling
 regrowth.

The second growth nature
 is indicated by large
Sassafras albidum in
 abundance, even though
 some oaks and beeches
 are up to 1 m. dbh. The
 forest is mixed *Quercus*
alba, *rubra*?, *palustris*?
secundum var. *fuscus*
grandifolia, etc. *Ulmus* sp.

Some of the red oaks are
 succumbing to oak wilt.

In parts there is an
 abundant layer of
Ulmus saplings up to about
 1 m. tall, though few seem
 to attain more than that size.

culms spreading to erect,

culms erect, to 1.5 m. tall.

small clumps, flowers
 white.

and *Ulmus* is not
 abundant in canopy layer.
 Instruments that the
 Wabash College people have
 in old field and in woods
 indicate that the relative
 humidity and soil
 moisture are lower in
 the woods than in the
 old field.

A few photos in beech-maple-
 oak forest.

left. 1 - Point Pelee National Park, Lake Erie, near Leamington. A triangular spit jutting out into Lake Erie near its western end. Consists of a beach ridge on both sides enclosing low ground with extensive ponds and Phragmites marshes, these not connected with the lake. Along the west side are many lots with cottages in private ownership, several fields and orchards. The slightly higher sandy ground along the west side and near the point is covered by a deciduous forest with a large admixture of Juniperus, mostly tall rather typical *J. virginiana* but with also, in open places, a considerable series of low ascending and spreading to prostrate forms, possibly forming a hybrid complex. Around the margins of this forest *Ptelea trifolia* and *Rhus canadensis* are common. *Asperugo officinalis*, etc. Birds are plentiful.

The beach along the west side of the point is stabilized by use of very ugly L-shaped slabs of concrete.

Between Windsor and Leamington is a thoroughly agricultural area on low broad terraces bordering the lake. Among crops noticed were peaches and a very little tobacco. The leaves of the latter were very large and a pale whitish green. Tomatoes are produced in great abundance.

left. 2 - East of Leamington,
at least to Blenheim, tobacco
is one of the principal crops,
with maize and tomatoes,
some peaches and plums.

Woodlots are extremely scarce, somewhat more common eastward till at Ft Bonheim and eastward they are more a part of the landscape.

Along the shore are cliffs perhaps 20 m. high, bounding a very wide terrace of clay with small gravel which is eroding at the edge so rapidly that there is little or no vegetation on them (photos). Along the cliff top the principal plants are *Solidago* and

aster or low masses of
Rhus and *Vitis* sp.

left. 2 - 11 mi. w.s.e. of
Cedar Springs, 4 mi. s.e. of
Merlin, ~~near~~ Lake Erie.

39626 2 *Vitis riparia* Ma. possibly off. var. spicata
climbing on bushes at edge of cliff,

2 27 *Ludwigia polycarpa*
very common in dry roadside
swale.

3 28 *Echinochloa*
very common in drying
roadside swale, with #39629.

3 29 *Echinochloa*
very common in drying
roadside swale, with #39629.

left. 2 Rondeau Provincial Park
Lake Erie.

Flat sandy peninsula
densely wooded in interior
with mostly beech-maple,
some elm and oak. prominent
shrub layer, sparse ground layer.

At Point aux Pins the forest
is largely *Tsuga canadensis* (?)
Quercus rubra ??, *Pinus strobus*,
Quercus alba, *Tilia* sp., *Sassafras*,
soil is a mixture of sand and
gravel. Rather thick undergrowth

of *Fraxinus* and *Kassia* sp.

extensive woody vine,
fruits blue-black, not
sweet and with a disagreeable
flavor.

culms almost erect.

culms almost erect.

saplings. Thick ground
layer of many herbs and
very small shrubs and
seedlings.

A ~~to~~ strip back of the beach
^{subhalo} ~~is~~ about 10-15 m. wide has
herbs such as *Panicum* (?) sp.,
Polygonia, *Artemisia*, *Andropogon*,
Scorpiurus, *Apocynum cannabinum*
(in prostrate form), *Andropogon*
gerardii, etc. *Rhus toxicodendron* (dwarf form).

The *Quercus rubra* here is very
odd. Looks not V-shaped buds large,
hairy.

In open beach Ulmus,
Ostrya, Fagus Acer rubrum,
Acer nigrum var. boreum comm.
Rhus typhina and
R. canadensis common in
ground cover. Maianthemum
occasional, here under hardwoods.

A form of Asclepias
tuberous with very
small cymes and pale
orange flowers common in
clearings back of beach

In central part of park
in deep forest is an elm
about 100' tall, 2 ft. + diam.
above buttresses. Buttresses
very wide, about 4 ft. high.

Dense ground cover of Bockmiera,
Collinsonia, Onoclea. Area
low, swampy, with
beech-maple forest. Nearby
a Populus deltoides well over
100 ft. tall and over 3 ft. dbh.

Most trees in area ~~do~~ have
slight development of buttresses

East of Morpeth the tobacco
gradually drops out, maize
and hay are principal crops.
Woodlots become larger and
more frequent, some apparently
natural, some planted.
Some pasture. Near Clearfield

People come here for relaxation and enjoyment. Camping offers pleasure to many people. Please do not intrude upon, or disturb the enjoyment or rest of your fellow campers.

The Naturalist Programme of conducted walks, illustrated talks, labelled nature trails and a museum will increase your pleasure of the Park.

Rondeau attracts large numbers of people who come to enjoy a picnic, the beaches, or the natural setting. You can help to make your stay, and that of others more pleasant by being tidy. Containers are provided for all refuse. Broken bottles are dangerous when left lying on the ground. A commendable practice is, "leave the site a little tidier than you found it".

Fires are ever a problem and a hazard in a woodland park. Fireplace grilles are provided for your convenience, and also for your protection, as well as others. A fire that has been reduced to "DEAD OUT" can neither harm anyone, nor this beautiful Park.

Bath houses are provided on bathing beaches for those who come to swim. They must be used for dressing and undressing.

All rules and regulations in force, are based on a respect for the rights of yourself and all others.

Park Rangers are here to help you; you can help them by following the rules.

Suggestions or constructive criticisms are always welcome. We too can learn.

Clare E. Mapledoram
Minister.

F.A. MacDougall,
Deputy Minister.

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ONTARIO

DEPARTMENT
OF
LANDS AND FORESTS

Division of Parks

WELCOME TO:

R O N D E A U P R O V I N C I A L P A R K

Rondeau Park is a beautiful area in which has been preserved about 2000 acres of the finest hardwood forest types in Southern Ontario.

Many of the trees and plants growing in the Park are rarely found farther inland. Rondeau also embraces about 2000 acres of marshland. The combined area offers a habitat which attracts many species of birds and small mammals. A sizable deer herd thrives in the Park.

Sand beaches provide water recreational activities par excellence. There is opportunity for the angler to indulge in this favoured sport.

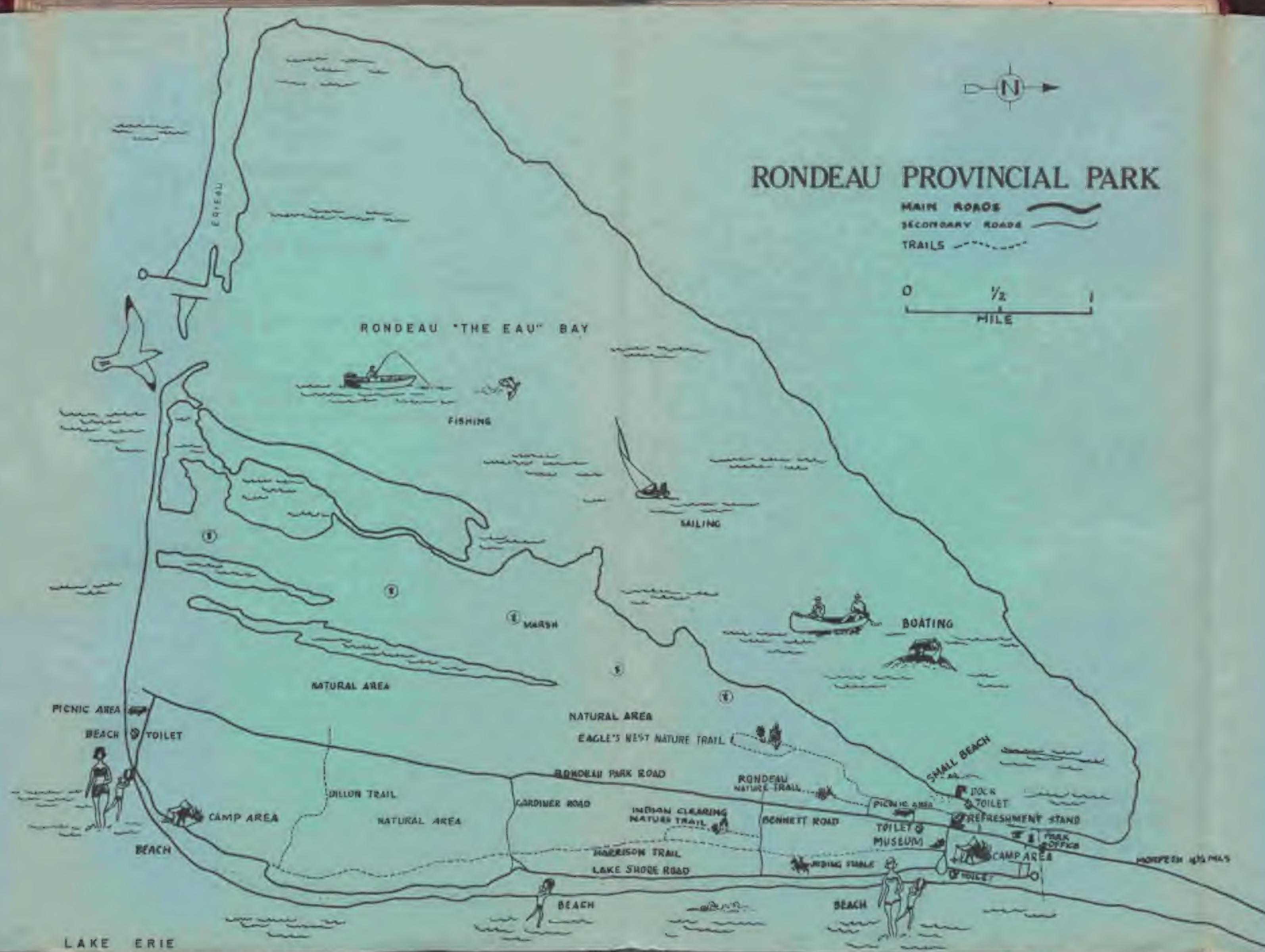
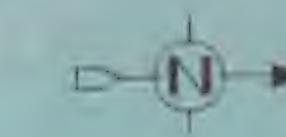
To "YOU", the visitor

This unique Park is maintained for your enjoyment by the Ontario Department of Lands and Forests. The woodlands, the beaches, the camp and picnic areas, the museum and nature trails, the buildings and facilities are maintained for your convenience and recreation. We ask that you care for them as though they were your own.

RONDEAU PROVINCIAL PARK

MAIN ROADS
SECONDARY ROADS
TRAILS

0 $\frac{1}{2}$ MILE





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OF
LANDS AND FORESTS
Division of Parks

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Ontario

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a series of pastures sta showing various stages in succession from grass to Crataegus thicket.

Near Eagle a different sort of tobacco is common called "brightleaf" with taller bushier habit, and smaller, greener leaves. This common here but not seen much elsewhere.

Up near St. Thomas country is more intensively cultivated with less woods, but with prominent hedgerows. East of St. Thomas consider grain.

The country near St. Thomas becomes more rolling and not perfectly flat as it is farther west. Orchard dropped out completely.

Eastward the land is rolling some woods. From Tillsonburg to Simcoe one of the principal crops is "brightleaf" tobacco. There are many woodlots and groves, some pastures. The tobacco is just starting to be harvested. The leaves are picked off, leaving the stalks standing.

In gray beach Ulmus,
Ostrya, *Fagus*, *Acer rubrum*,
Acer nigrum var. *became* common.
Rhus typhina and
R. canadensis common in
 ground cover. *Maianthemum*
 occasional, here under hardwoods.

A form of *Asclepias*
tuberosa with very
 small cymes and pale
 orange flowers common in
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In central part of park
 in deep forest is an elm
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 low, swampy, with
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 100 ft. tall and over 3 ft. dbh.

Most trees in area ~~do~~ have
 slight development of buttress

Great bed
 of small
 trees in
 alluvium
 between
 border
 beds
 and
 drifts.

East of Morpeth the tobacco
 gradually drops out, maize
 and hay are principal crops.
 Woodlots become larger and
 more frequent, some apparently
 natural, some planted.
 Low pasture. Near Cleared

a series of pasture lots
 showing various stages
 in succession from grass
 to *Crataegus* thicket.

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 standing.

39630'

Sept. 4 - ~~bottoms~~ just
north of Arkville, Catskill Mts.
Echinochloa crusgalli var. *fumigata* (L.) Wright culms erect, panicle
cultivated as a field crop

Catskill Mts. are well
wooded with hardwoods
with a liberal admixture
of *Pinus strobus* and
Abies canadensis. Some
Thuja plicata but this
might be planted. Near
the tops of some high
peaks and ridges
are slides or scree slopes
more or less bare of
vegetation or only sparsely
vegetated.

Sept. 13 - Sleepy Hollow, 1 mi.
south of Falls Church, Fairfax Co.

In mixed pine and hardwood
second-growth forest on rocky cliff
31 *Ulmus pumila* var. *foliosa* Jacq.
rare

32 *Ulmus procera* Salisb.
rare

Echinochloa crusgalli var. *fumigata* (L.) Wright culms erect, panicle
compact, purple and green.

young ^{sapling} ~~tree~~ up to 1.5-2 m. tall.
small tree 4 m. tall, with
deeply fissured very
corky bark.

Oct. 17 - photo of mixed hardwood forest with maize field in front west of Maxwell

photo of mixed broadwood
on hill e. of Markham. yellow
Lindendras, red cornus, green,
still green. Another, similar.
See Markham and Faring Royal

photos of hardwood forest
east side of Shyline Dr. at
about m.p. 7. same from
Rattlesnake Point Overlook -
showing Pinus densa.

From Front Royal to about
m. p. 9 *Lessertia* rather
abundant in most place
along drive. Large areas
of a very uniform low
forest on ridges and gentle
slopes - reddish brown in color.

Some steeper ridges and west facing slopes have a similar red-brown forest - probably of *montana* and *umbra* or *reticulata* - photo from Buck Hollow Overlook ^{and} north, across Thornton Gap.

Bet. m-p. 39+36 a fine area of uniform oak forest - f. rubra - velutina?
orange brown & photo from Pinnacles
Picnic ground, also one of Crataegus
Picnic Ground entrance.

Two photos north at Big Muddy
one showing Hawksbill, other

clump of *Betula populifolia*.

Eaton Hollow Overlook 2500' -
photos n.e. over Eaton Hollow - cove
hardwood, largely *lindendron*,
oak in some areas, a small
admixture of pine, especially
with oaks.

At first overlook north of Black Rock Gap, looking east, in valley is what appears to be a mixture of pine and spruce.

Bet. m.p. 90 and 91, on east side,
below are good mixed pine
and oak forests.

Just north of Riffle Gap Overlook is an area of *Quercus ilicifolia* mixed with pines and small hardwood. Not very striking. Better developed patch of *Q. ilicifolia* just below overlook. (2920')

At sawmill Run Overlook is an excellent example of *Quercus ilicifolia* scrub with abundant emergent pines.

From Calf Mt. Overlook can be seen numerous small hills emerging abruptly from floor of Shenandoah Valley erosion remnants?

Coloring at higher altitudes
just past its prime, excellent at
middle alt., not quite at best on lower slopes.

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1958 Virginia

July

Oct. 17 - Rip Rap Overlook, Skyline

Drive, Augusta Co.

on roadsides, edge of scrub

~~also~~ *Quercus ilicifolia* scrub.39633 *Aster pilosus* var. *platyphyllus*

rare

2 34 *Amaranthus albus* L.

rare

2 35 *Cyperus filicinus* Vahl

common

2 36 *Salix*

rare in edge of scrub

Oct. 18 - Blue Ridge Parkway at
Mile Post 9, south of Humpback Rock,
Augusta Co.

weedy road embankment

3 37 *Hedysotis purpurea* var.

with nos. 39638 and 39639 in

2 38 *Hedysotis purpurea* var.

with nos. 39637 and 39638 in

2 39 *Hedysotis purpurea* var.

with nos. 39637 and 39638 in

Oct. 18 5 mi. n.e. Lexington, 3 mi. s. of
Rockbridge Batties, on ~~at~~ ridge
east of Maury River, Rockbridge Co.
in steep ravine cut in limestone4 40 *Thuya occidentalis* L.

common in small area in thin woods

9 41 *Oxybaphus rigidior* (L.) C. R.

common in shallow soil in thin woods

Shenandoah Nat. Park 177

2900'

890m

(7-9) Blake? Clump of branches from a mowed plant, old stem stiff.
 rays white, disk turning reddish.
 diffusely branched, main stem erect, branches ascending.
 culms spreading to ascending
 in small tufts.
 shrub 1.5 m. tall, leaves
 glaucous beneath.

representing a very polymorphic population - in small dense tufts.

same

same

crooked tree 25 cm. diam., with branches almost to base.
 fruit ~~at~~ smooth, not ribbed dorsally when fresh.

West
slope

396

2

2

2

2

3

7

3

4

1

Oct. 17 - Blue Ridge Parkway →
 In first mile ericaceous
 understory to be seen locally.
 Shenandoah Valley View -
 (2355'). Magnificent
 hardwood forest here
 and on hills below,
 very mixed in composition,
 coloring now at its height -
 Rhododendron and Camphor yellow,
Quercus prinus greenish brown.
Coronilla red, *Quercus rubra*
 red or still green, Robins
 green turning yellow, *Fraxinus*
 purple yellow, etc. This
 extends in very good
 development at least to
 Humpback Rocks. No
 ericaceous understory
 at all here.

About m.p. 7 in a valley
 to the west is a striking area
 of solid pine, probably an
 old field. Below this is a
 high dam, evidently not
 ordinarily filled with water -
 probably flood control only.

At m.p. 9 photos in hardwood
 forest. just south of here a patch
 of Rhododendron understory,
 but this is generally lacking
 in this area. Rocks in this
 area are mostly greenish.
 Excellent *Polypodium*, etc.

common -

20-minute cliffs overlook -
 steep slopes have mainly
 chestnut-oak forest, with
 scattering of other oaks,
 and pines, in places with
 understory of *Quercus*
^{and Ericaceous} *ilicifolia*, *Ilex mucronata*
 on rocks around overlook.
 In valley below cove forest
 with *Rhododendron*, *Pinus*
strobus, *Fraxinus*, ^{larch, hemlock}, etc.
 Cultivated and abandoned
 fields in valley and on hills
 opposite. Colors about peafed.
 Rocks covered by *Umbilicaria*
 and other lichens.

^{From here south}
~~South of here~~ the rock changes
 to shale. Ericaceous understory
 generally present. Forest
 has low stature. Trees
 have more nearly lost
 their leaves. Alt. 3000' +

From m.p. 25 to 30 many farms
 and pastures, country generally
 disturbed. M.p. 30-35, *Tsuga*
 becomes common, some *Pinus strobus*
 and other pines in hardwood
 forest. Ericaceous understory
 absent or poorly developed. M.p.
 35-42 low altitude, 25-2400'.
Pinus strobus mixed in
 hardwood, no Ericaceous to
 amount to anything. South
 of here for several miles

good hardwood forest, then 1 mile or two on crests with low forest and scrub. some green *iliacifolius* and vine.

Canyon from m p 47 down to Buena Vista ~~the~~ has steep walls, largely covered by pine & low undergrowth of *Vaccinium*, etc. prominent.

North on R. 39 from Lexington-limestone ridge e. of Maury River with thin oak forest, much *Juniperus*, some *Tilia virginiana* and a stand of *Thuya occidentalis* in a steep ravine - s. of Rockridge Bath, n. of Lexington.

West Virginia - road from Marlinton to Elkins, near Hvy. Fork hardwood forest, *acer* prominent locally, some *liriodendron*, much oak & birch. (photos w. of Hvy. Fork, 2 e. ~~the~~ half with meter set at 100, other half vegetation less light)

Yugert Valley - photo of *acer nigrum* (?) also mixed forest.

The forest throughout this part of West Virginia is well colored, though many

leaves have fallen, some very prominent, especially the oaks and birches.

Photos of hardwood forest in pass at Elkins & Alpine. *liriodendron* conspicuous.

Crumbling shale cliffs - Mouth of Seneca - *Geranium robertianum*, *Dryopteris marginata*, *Asplenium trichomanes*, *Hedysarum*.

Seneca Rocks - spectacular backbone of hard tilted rocks, continuation of ridge seen farther north still farther north along North Fork two walls of this same rock can be seen parallel on the hills (photos)

Photos of *Quercus alba* (purple-marrow) against a hillside of oak-birch forest, juniper in front (North Fork)

Northwood, where road cuts through the broad sides is a talus where *Pellaea*, *Woodia*? *Draba*, etc. grow both in talus and crevices of hard fossiliferous limestone or limy sandstone. Is this Seneca formation?

4 mi. E.
Tinkers
Caves

Smoke Hole Road - from north, goes over high mountain, covered with deciduous forest in full color. *Acer spicatum*, *fumatum*, etc. Ravines are dry or almost so. Whole aspect one of dryness.

Smoke Hole recreation area has flat bottom land with grass, hemlocks, pine, *Platanus*, etc. steep walls with mixed hardwood forest with scattered pines on east wall, no hemlock. On west wall almost no conifers.

Fairly large stream.

Rich ground flora in hemlock grove on east wall - *Asplenium*, *Polystichum*, *Dryopteris*, *Adiantum*, *Hedera*, *Solidago*, *Carex*, etc. but no *Maianthemum* seen. Small patch of *Asplenium* *bigiphyllum* on rocks.

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1958 West Virginia

~~Oct. 19~~
Oct. 19 - Mouth of Beneca,
Beneca Creek
on crumbling shale cliff

39642 *Oxyopteris marginalis*
common

1 43 *Hedysotis purpurea var. tenuipolia*
rare

2 44 *Asplenium trichomanes*
common

Oct. 19 - North Fork River, 1.4 mi.
s. of Smoke Hole Cavern,
at in crevices and talus
at foot of limestone cliff

2 45 *Muhlenbergia*
common

1 46 *Woodisia obtusa*
rare

1 47 *Draba*
common

1 48 *Pellaea*
rare

~~Oct. 19~~
Oct. 19 - Smoky Hole Reservation
Pendleton Co.

1 49 *Asplenium rhizophyllum* L.
small colony on rocks
in hemlock grove on steep
west slope

185

glaucous

prostrate, rooting
at tips

186

17478 District of Columbia

79650

Oct. 11 - Washington, 18th & New Jersey
ave. weedy place along sidewalk
Panicum dichotomiflorum Michx.

187

culms spreading, depressed

188

189

190

191

192

193

192

194



